THE IRON AGE

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Shop Training Fits Boys for Key Positions

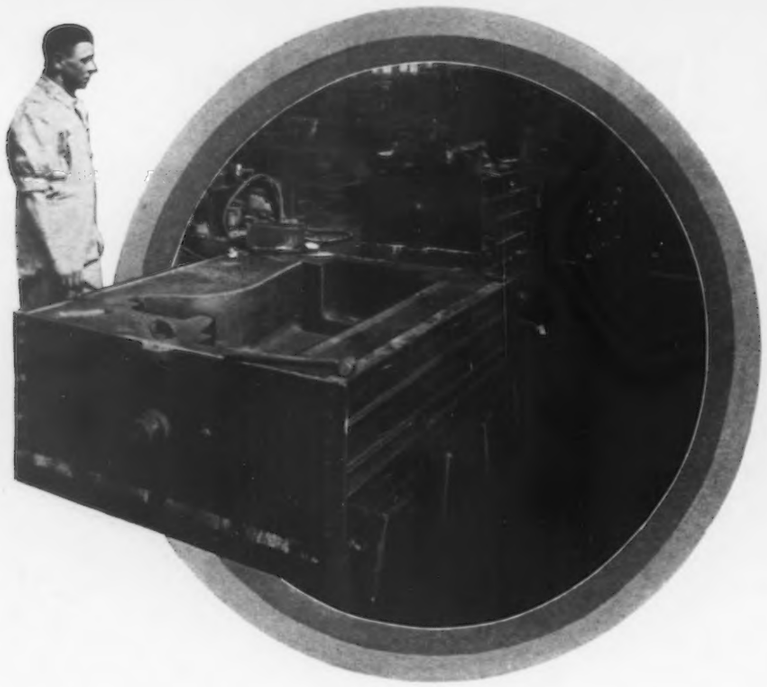
"THEY succeeded from the very start, and at once became leaders and teachers of other mechanics, suggesters of new methods of work and of new means for its accomplishment."

Thus is the partnership of Francis A. Pratt and Amos Whitney, established in 1860, characterized by Prof. Joseph W. Roe in his treatise on English and American Tool Builders.

These founders of the Pratt & Whitney Co., Hartford, Conn., had served apprenticeship under able masters, and, like the Colt Armory, their shop became, in turn, the training school for many men since prominent in the machine tool and allied industries. The roster of those who have worked in the Pratt & Whitney shops includes Worcester R. Warner, Ambrose Swasey, A. F. Foote, William Gleason, E. P. Bullard, E. C. Henn, R. Hakewessel, G. C. Bardons, J. N. Lapointe, F. N. Gardner, John Johnston and many more.

Apprentice training at such a plant naturally is deep rooted. Noteworthy also is the present congenial environment. Many of the skilled mechanics, foremen and other executives with whom the apprentice is in daily contact are P. & W. graduates, while the president of the company, Clayton R. Burt, is an outstanding product of another great training school, that of the Brown & Sharpe Mfg. Co., Providence. Thus, in the concrete examples around him, an ambitious boy can see the future possibilities of his training; in being associated with men who have traveled the same route, he may feel that his training is under sympathetic and authoritative guidance.

For many years the company has had from 40 to



50 apprentices in the shop at all times, and it is planned to increase this number. Three-quarters of the boys enroll for the machinist apprentice course. From their ranks it is hoped ultimately to recruit foremen, inspectors, production men and other executives. Having skilled mechanics, familiar with the company's methods, standards and products, available for various key positions in the organization is, of course, of immense advantage to the company.

Training includes a varied shop experience, supplemented by classroom instruction four hours each week at the Hartford Trade School. The course for machinists and molders is laid out to cover a period of three years; the pattern-making course covers four years and the core-makers' course, one and one-half years. If at the completion of his regular course the young man desires more intensive experience in any branch, as for example tool making, he is permitted to continue if selected.

The system is organized around a supervisor of apprentices. In being a Pratt & Whitney graduate, and having served the company in various executive and other capacities, the present supervisor is well qualified, both through thorough knowledge and experience in the trades taught.

Careful Selection of Applicants

One point to be emphasized in describing this apprentice system is the care exercised in selecting applicants for training. In the first place the boy must have sufficient education and must, upon test, reveal mechanical aptitude. He must give evidence of definitely knowing which course he wants, and show promise of going through his training to the finish. The boy who will not study, who has no

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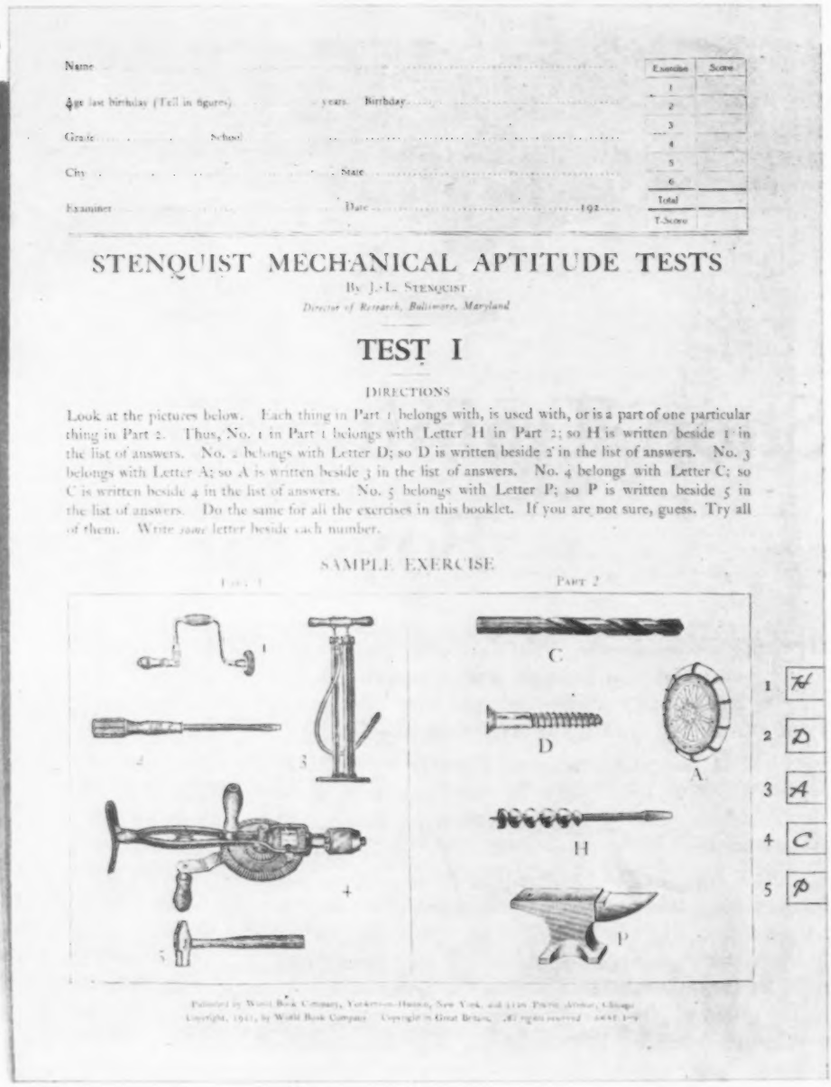

Name .....

Age last birthday (Tell in figures) ..... years. Birthday .....

Grade ..... School .....

City ..... State .....

Examiner ..... Date ..... 192....

Exercise	Score
1	
2	
3	
4	
5	
6	
Total	
T-Score	

STENQUIST MECHANICAL APTITUDE TESTS

By J. L. Stenquist

Director of Research, Baltimore, Maryland

TEST I

DIRECTIONS

Look at the pictures below. Each thing in Part 1 belongs with, is used with, or is a part of one particular thing in Part 2. Thus, No. 1 in Part 1 belongs with Letter H in Part 2; so H is written beside 1 in the list of answers. No. 2 belongs with Letter D; so D is written beside 2 in the list of answers. No. 3 belongs with Letter A; so A is written beside 3 in the list of answers. No. 4 belongs with Letter C; so C is written beside 4 in the list of answers. No. 5 belongs with Letter P; so P is written beside 5 in the list of answers. Do the same for all the exercises in this booklet. If you are not sure, guess. Try all of them. Write *some* letter beside each number.

SAMPLE EXERCISE

Part 1 Part 2

1 H
2 D
3 A
4 C
5 P

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FIG. 1.—Applicants for Apprentice Training Must Pass This Stenquist Mechanical Aptitude Test. The cover page of this test and that of the Otis test on the opposite page—both copyrighted—are here reproduced by permission of the World Book Co., Yonkers, N. Y.

interest in further education, is not wanted. It should be said parenthetically that if in a position to continue his high school or college education, the boy is encouraged to do so and postpone starting his practical shop training.

Less tangible, but of great importance, are character qualifications. The company wants to train normal, healthy minded young men who have some ambition, and is especially glad to enlist boys who may ultimately qualify for positions of responsibility with the company.

From past experience the company has determined upon the ages between 17 and 22 as the best for starting apprentices. As a rule, boys older than 22 are not sufficiently adaptable, while those under 17 usually have not enough education. Preference is given high school graduates who have had courses in mechanical drawing, mathematics and in vocational branches; about one-half of the applicants are such graduates. To be taken as a machinist apprentice a boy ought to have had at least one year in high school.

Enlist Boys from All States

Applications are received from boys in all parts of the United States. A waiting list is maintained, and when one or more apprentices are wanted the applicants are notified. If the boy lives in or near Hartford he is requested to call with one of his parents or his guardian for a personal interview. Boys living at a distance receive an application blank designed to give information regarding their education, employment, health and other matters that might aid the supervisor in sizing up the applicant.

All prospective apprentices receive a copy of the company's booklet "Learning a Trade at Pratt & Whitney." This booklet, attractively made up, outlines the various courses, terms of apprenticeship, living conditions in Hartford, etc., and contains many views of the shop departments and the company's products and their making.

In the first personal inter-

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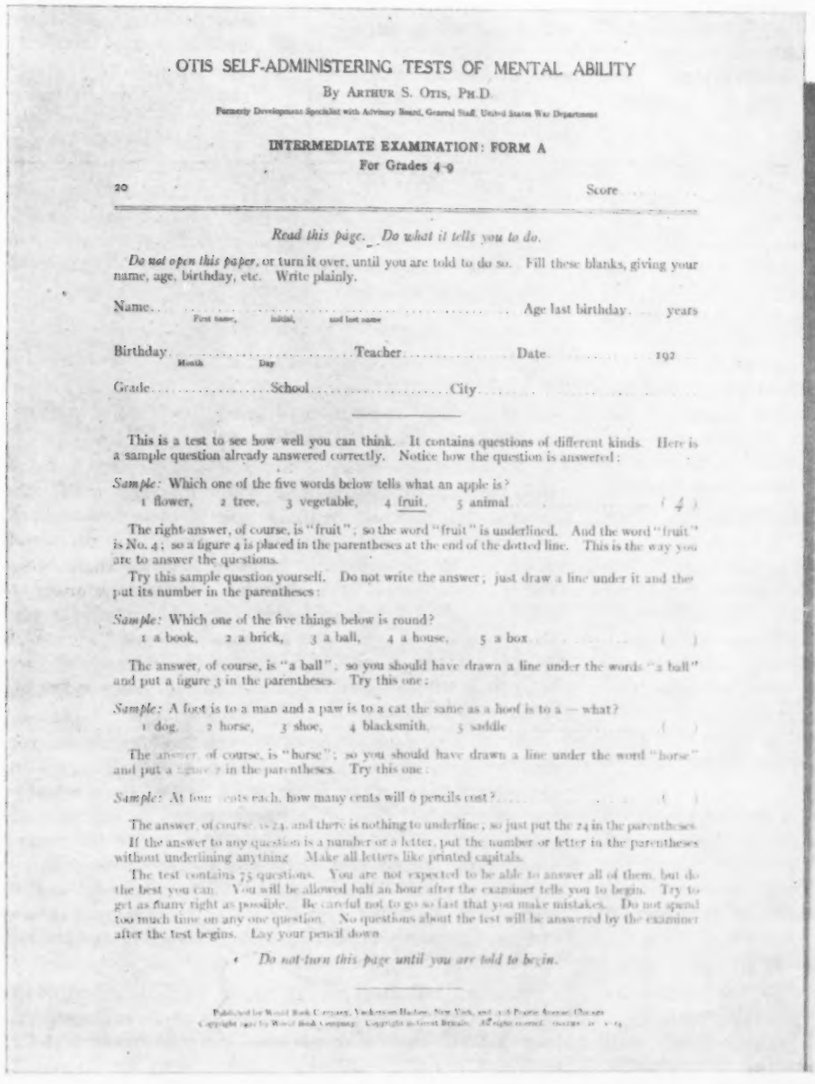

OTIS SELF-ADMINISTERING TESTS OF MENTAL ABILITY

By ARTHUR S. OTIS, PH.D.

Formerly Development Specialist with Advisory Board, General Staff, United States War Department

INTERMEDIATE EXAMINATION: FORM A

For Grades 4-9

20 Score

Read this page. Do what it tells you to do.

Do not open this paper, or turn it over, until you are told to do so. Fill these blanks, giving your name, age, birthday, etc. Write plainly.

Name ..... Age last birthday ..... years
(First name, Initial, and last name)

Birthday ..... (Month, Day) Teacher ..... Date ..... 192..

Grade ..... School ..... City .....

This is a test to see how well you can think. It contains questions of different kinds. Here is a sample question already answered correctly. Notice how the question is answered:

Sample: Which one of the five words below tells what an apple is?
1 flower, 2 tree, 3 vegetable, 4 fruit, 5 animal ..... (4)

The right answer, of course, is "fruit"; so the word "fruit" is underlined. And the word "fruit" is No. 4; so a figure 4 is placed in the parentheses at the end of the dotted line. This is the way you are to answer the questions.

Try this sample question yourself. Do not write the answer; just draw a line under it and then put its number in the parentheses:

Sample: Which one of the five things below is round?
1 a book, 2 a brick, 3 a ball, 4 a house, 5 a box ..... ( )

The answer, of course, is "a ball"; so you should have drawn a line under the words "a ball" and put a figure 3 in the parentheses. Try this one:

Sample: A foot is to a man and a paw is to a cat the same as a hoof is to a — what?
1 dog, 2 horse, 3 shoe, 4 blacksmith, 5 saddle ..... ( )

The answer, of course, is "horse"; so you should have drawn a line under the word "horse" and put a figure 2 in the parentheses. Try this one:

Sample: At four cents each, how many cents will 6 pencils cost? ..... ( )

The answer, of course, is 24, and there is nothing to underline; so just put the 24 in the parentheses.

If the answer to any question is a number or a letter, put the number or letter in the parentheses without underlining anything. Make all letters like printed capitals.

The test contains 75 questions. You are not expected to be able to answer all of them, but do the best you can. You will be allowed half an hour after the examiner tells you to begin. Try to get as many right as possible. Be careful not to go so fast that you make mistakes. Do not spend too much time on any one question. No questions about the test will be answered by the examiner after the test begins. Lay your pencil down.

Do not turn this page until you are told to begin.

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FIG. 2.— Fitness of the Applicant to Go Ahead with the Prescribed School Work Is Determined by Means of the Otis Self-Administering Tests of Mental Ability. Being on a time basis, the test also serves to determine the boy's interest in his further education

view, which is largely a matter of sizing up the applicant, the boy is requested to solve a few mathematical problems as a check-up on his claims to schooling. The application blank sent to prospective apprentices living at a distance is accompanied by a letter which invites further correspondence. From the filled-out blank and the ensuing correspondence the supervisor determines whether to arrange for a personal interview at the plant.

If after the personal interview the boy proves acceptable, he is sent to the shop hospital for physical examination. If he passes this successfully he is sent to the Hartford Trade School for a Stenquist Mechanical Aptitude Test (shown, in part, in Fig. 1), and the Otis Self-Administering Tests for Mental Ability (Fig. 2). The Otis test is intended to show fitness to go ahead with the school work; it is on a time basis, and therefore lack of interest may be reflected in any dawdling on the part of the boy answering the questions. The applicant's interest is carefully determined at all stages of his hiring and training. If the boy passes these tests he is placed on the waiting list or is notified to start his trial period in the plant, as the case may be.

THE Pratt & Whitney plant, which has been training apprentices since its founding in 1860, has graduated many men since prominent in the machine tool and allied industries.

Great care is exercised in selecting apprentices. The applicant must show very definite interest in the particular training for which he applies. He must be physically fit, have sufficient preliminary education and upon test show mechanical aptitude. Character requirements are carefully considered; the company wants boys that will stick, and is especially desirous of enlisting those who may ultimately qualify for positions of responsibility with the company.

Having been accepted and started on his course, the boy, parent or guardian enters into a formal Apprenticeship Agreement. The guardian is required to pay the sum of $25 at the expiration of the trial term of three months. The company agrees that upon the completion of the term of apprenticeship to give the apprentice its equity in one-half the cost of the box of tools given to the apprentice upon signing the agreement, a certificate of apprenticeship and the sum of $125, this being a refund of his initial deposit of $25, plus a bonus of $100. Although this agreement is executed after a probationary period of three to six months, apprenticeship actually dates from the beginning of the probationary period. The apprentice starts his school work two weeks after his matriculation.

Before the apprentice is taken into the shop, he receives instruction in safety practices, use of measuring tools, shop rules, pay periods, etc., from the supervisor. From the beginning until graduation the supervisor keeps in constant touch with the boys in training. He visits the boy at his work several times a week, talks with the foreman or assistant foreman, follows up the Trade School progress of the boy and, when necessary, checks up on the living quarters and general environment of out-of-town apprentices.

Each quarter the foreman makes a formal report on each boy to the supervisor, who enters the record on a card, Fig. 3. This is later sent to the Trade School for entries of the school marks; a report, accompanied by a letter, is then sent to the boy's parents or guardian by the director of the Trade School.

In the case of poor marks, either in school or shopwork, the boy is required to report to the apprentice supervisor. Boys who neglect their studies or their work because of laziness or a slump in interest, those who fail to observe the rules of the shop, or who fail to respond to the authority of the foremen, or supervisor, are disciplined.

As the apprentice progresses through the shop the Progress Record card, Fig. 4, is maintained by the supervisor from information received from the foremen. This rating card serves mainly as a detail record of the apprentice's progress, but is also believed to have a beneficial psychological effect on all concerned. To acquaint the boys with the products of the shop they receive bulletins and other trade publications issued by the company.

At the completion of their apprenticeship, the graduate gets two diplomas, one from the company and another from the Hartford Trade School. A pocket card and leather case is also presented by the company; this serves as a certification, in convenient form, that the boy has duly completed his apprenticeship with the Pratt & Whitney Co.

At the completion of his course the boy, now a journeyman, is taken to meet the president and other major executives of the company. He meets men who, having served similar apprenticeship, can heartily congratulate graduates with having the backbone necessary to complete their three or four years of practical training. And, through their own first-hand experience, these men are able to outline some of the future positions to which the graduate may aspire, providing his ambitions are backed by continued determination to go through with what he undertakes.

Machinist Courses Comprehensive

ARRANGEMENT of the Pratt & Whitney shop is in specialized departments, such as the milling, planing, grinding, etc., the parts of all machines being routed progressively to the final operation, assembly.

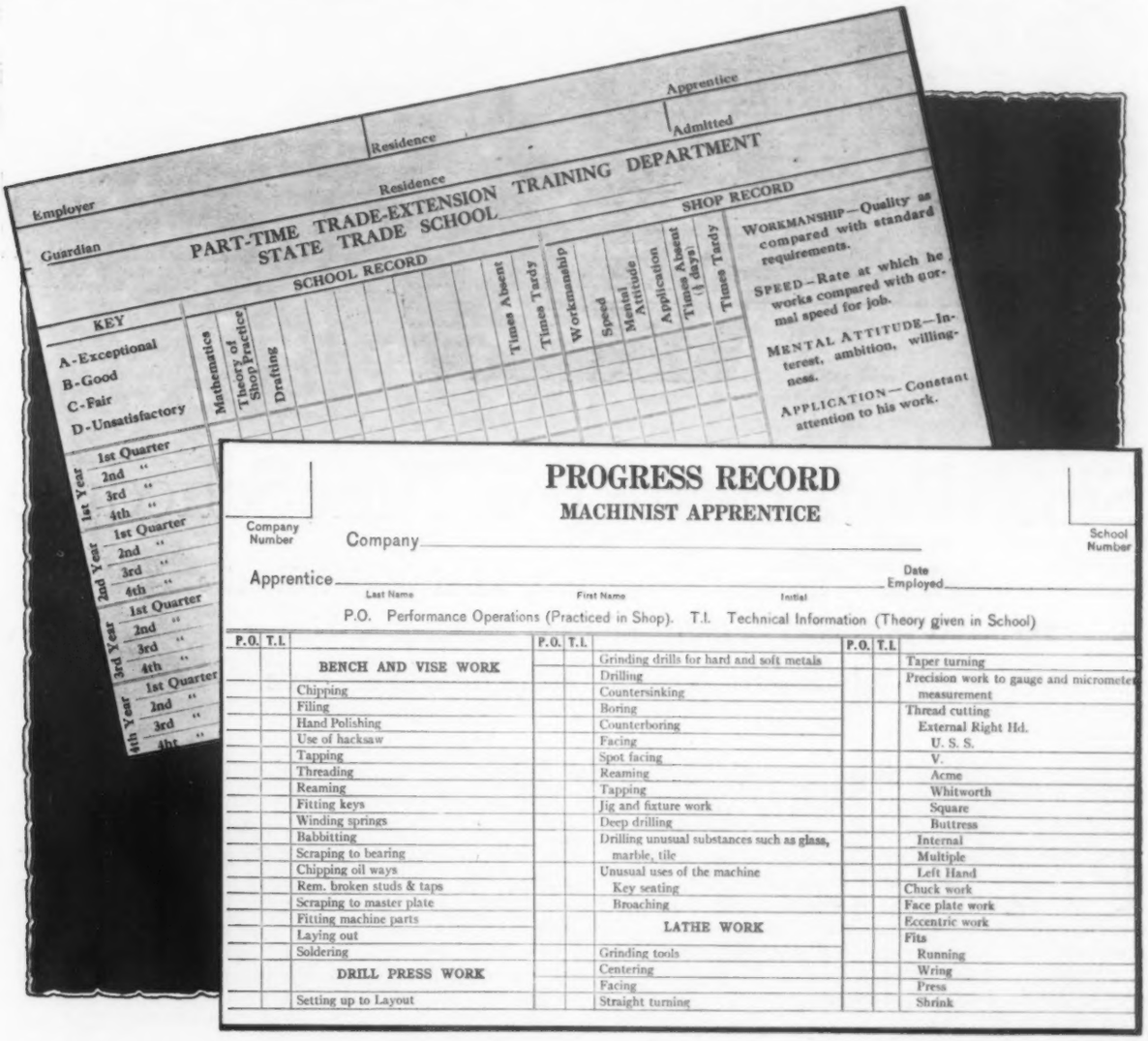
Machinist apprentices start in one of five departments, steel turning, drilling, milling, screw machine or cast iron turning department. In the course of their training they go through 13 or 14 departments, spending practically three months in each, and halfway through their course they put in a period in the foundry. They work under the direction of the various foremen and assistant foremen. The first piece of every new set-up on which the apprentice works is taken to the inspector in the department, who inspects it with the boy and shows him the reasons for any changes to be made.

In the first year of the course the machinist apprentice may work in the cast iron turning department, drilling and boring department, screw machine and the steel turning department. One of the first things he learns is the grinding of tools to proper shapes and angles for various work. The second year finds him in the milling, thread milling, planing, hardening and the assembling departments. In the third year he works in the gear cutting and gear grinding, general grinding, assembly and the tool and equipment departments.

Apprentices work on all types of lathes and, when skilled enough, they are permitted to perform thread cutting and some of the other finer operations that make up toolroom practice. Drilling includes work on single and

multiple-spindle machines and on radials. Use of jigs and fixtures is part of their experience, as well as the proper grinding of drills, proper speeds and feeds for various materials and the proper tapping of holes.

Instruction given on hand screw machines includes setting up, the boys being required to adjust the machine for



Employer
Residence
Apprentice
Guardian
Residence
Admitted

PART-TIME TRADE-EXTENSION TRAINING DEPARTMENT
STATE TRADE SCHOOL

SCHOOL RECORD

KEY
A-Exceptional
B-Good
C-Fair
D-Unsatisfactory

		Mathematics	Theory of Shop Practice	Drafting	Times Absent	Times Tardy	Workmanship	Speed	Mental Attitude	Application	Times Absent (½ days)	Times Tardy
1st Year	1st Quarter											
	2nd "											
	3rd "											
	4th "											
2nd Year	1st Quarter											
	2nd "											
	3rd "											
	4th "											
3rd Year	1st Quarter											
	2nd "											
	3rd "											
	4th "											
4th Year	1st Quarter											
	2nd "											
	3rd "											
	4th "											

SHOP RECORD

WORKMANSHIP—Quality as compared with standard requirements.

SPEED—Rate at which he works compared with normal speed for job.

MENTAL ATTITUDE—Interest, ambition, willingness.

APPLICATION—Constant attention to his work.

PROGRESS RECORD
MACHINIST APPRENTICE

Company Number
Company
School Number

Apprentice
Last Name First Name Initial
Date Employed

P.O. Performance Operations (Practiced in Shop). T.I. Technical Information (Theory given in School)

P.O.	T.I.		P.O.	T.I.		P.O.	T.I.	
		BENCH AND VISE WORK			Grinding drills for hard and soft metals			Taper turning
		Chipping			Drilling			Precision work to gauge and micrometer measurement
		Filing			Countersinking			Thread cutting
		Hand Polishing			Boring			External Right Hd.
		Use of hacksaw			Counterboring			U. S. S.
		Tapping			Facing			V.
		Threading			Spot facing			Acme
		Reaming			Reaming			Whitworth
		Fitting keys			Tapping			Square
		Winding springs			Jig and fixture work			Buttress
		Babbitting			Deep drilling			Internal
		Scraping to bearing			Drilling unusual substances such as glass, marble, tile			Multiple
		Chipping oil ways			Unusual uses of the machine			Left Hand
		Rem. broken studs & taps			Key seating			Chuck work
		Scraping to master plate			Broaching			Face plate work
		Fitting machine parts			LATHE WORK			Eccentric work
		Laying out						Fits
		Soldering			Grinding tools			Running
		DRILL PRESS WORK			Centering			Wring
					Facing			Press
		Setting up to Layout			Straight turning			Shrink

a given job from the blueprint. Working knowledge of automatic screw machines is also available and opportunity given later to build on this knowledge if the boys desire.

In milling, the boys start with the rougher and simpler jobs, and in constantly returning to the milling machine in various departments throughout their training, they receive comprehensive training on this class of machine tool. Proper clamping of the work, grinding of tools, removal of casting strains by proper roughing cuts and the correct method of finishing, are taught in the planing department; use of the square and bevel protector and other planer work measuring tools.

Experience in the grinding department includes work on cylindrical, internal, surface, cutter and other types of grinders. In general the boy must be fairly skilled before he is permitted to do much grinding, because grinding usually being the last operation on a piece, spoilage can be very large. For this reason grinding is generally one of the last jobs an apprentice receives in his course.

Before doing much in the assembling department the apprentice must have shown himself to be a good machinist and familiar with machine tool operations. In this department the apprentice gets his best experience in machine tool design and methods; because he sees the entire machine in the process of assembling and the reasons for every dimension, rather than merely having to follow blueprint instructions. He also takes part in the "running in" of machines before their shipment.

Toolroom work includes experience in making jigs and fixtures, experimental machines and special small tools and gages. In working to limits of 0.0001 in. and better the machinist apprentice learns the meaning of close accuracy. By applying himself to his work, the apprentice may obtain an unusually thorough training that will serve as a substantial foundation for advancement to positions of responsibility in the mechanical industries.

FIG. 3—The Formal Report Card (upper illustration) Is Made Up Quarterly. The shop record is furnished by the foreman of the department in which the apprentice is working. With the Trade School marks entered, the report is sent to the boy's parents or guardian

FIG. 4—The Progress Record (lower illustration) Serves Mainly as a Detail Record of the Apprentice's Course Through the Shop. It is maintained by the supervisor of apprentices

Small Parts Heated on Time Schedule

Electric Furnaces Automatically Held at Heat Receive Stipulated Number of Parts on Rack or Fixture, Which Are Quenched After Scheduled Time

BY WIRT S. SCOTT*

PORTABLE tools, electrically driven, require the heat treatment of numbers of small parts. For example, in addition to the line of accessory tools, a portable electric drill requires the hardening and tempering of an armature shaft for electric motor, armature pinion, first intermediate gear and pinion, second intermediate gear and pinion, spindle gear, and numerous small parts such as keys, washers and dowel pins.

For such operations, Black & Decker Co., Towson, Md., formerly used gas furnaces. Production consists of portable electrically driven tools of very high quality, such as drills, bench and pedestal grinders, valve grinders, valve refacers and stands, and tools for such equipments. During a period of years, the old furnaces have been replaced by electric furnaces, until now the heat-treating department is 95 per cent electrified with small electric furnaces, admirably adapted to a multiplicity of small parts.

One-half inch electric drills constitute approximately 15 per cent of the total production at the Black & Decker plant. An average monthly production of 1370 complete units of this size involves 11,000 pieces per month to be heat treated for this item alone. The total cost of the heat treatment for the parts for one of these electric drills, including electric power, labor and overhead, is $0.188, while the total factory cost of the same parts is $1.64 per tool.

The total weight of steel heat treated for all variety of tools is approximately 25,000 lb. per month, or 200,000 pieces with an average weight of 2 oz. No exact figures are available on the power consumption of the electric furnaces, hence an estimate was based upon furnace performance, radiation losses, idling periods such as heating up in the morning, as well as door losses while charging the furnaces. On the basis of a hardening temperature of 1550 deg. Fahr. and tempering at 400 to 600 deg. Fahr., the monthly consumption for the 200,000 pieces would not be in excess of 9600 kwhr. At the power rate of 1.2c. per kwhr. obtained from the Consolidated Gas & Electric Co., the cost of electricity would be $115.20 per month. This is approximately 30 per cent more than the cost of gas fuel for performing the same operation, with gas at 70c. per thousand cu. ft. Therefore, it will be of interest to observe why electric heat, in the face of increased fuel cost and added investment, is considered the most economic form of heat treatment.

As a matter of fact, the cost of fuel or electricity is relatively small in comparison to the total heat treating cost or to the total factory cost. The cost of electricity is only 1¼c. per electric tool unit, whereas the total heat treating cost is 18.8c. and the total factory cost is $1.64, or 6.6 per cent and 0.76 per cent respectively.

Equipment in Heat-Treating Department

Parts heat treated consist mostly of chrome-nickel and chrome-vanadium steels (S.AE. 3140 and 6145). Heat treatment consists of hardening and tempering all parts,

*Special representative, Westinghouse Electric & Mfg. Co., Mansfield, Ohio.

plus a certain amount of carburizing on gears and pinions. Equipment comprises the following:

Two 5-kw. preheating ovens, operating at 750 deg. Fahr. as a maximum.
Two 8-kw. hardening furnaces for heats of 1475 to 1625 deg. Fahr.
One 11-kw. hardening furnace for heats of 1475 to 1625 deg. Fahr.
One 15-kw. hardening furnace for heats of 1475 to 1625 deg. Fahr.
One 40-kw. carburizing furnace to operate at 1650 to 1700 deg. Fahr.
One 5-kw. oil tempering bath, to operate at a maxmium of 400 deg. Fahr.
One gas heated tempering bath (melted sodium-potassium nitrate), to operate at 900 deg. Fahr. maximum.
One Crescent washing machine using caustic soda solution.

Much experimentation has proved to the Black & Decker Co. that for its particular product, with the best alloy steels obtainable, there are four conditions of heat treatment that must be met and accurately duplicated in order to obtain the maximum results from the steel, namely:

1. A definite rate of preheating.
2. A maximum temperature held within close limits
3. A definite soaking period.
4. A definite rate of cooling.

The first three conditions are functions of a furnace, and are met in an ideal manner by the electric furnaces. With a known mass of material in each charge, placed within the furnace, the operator knows exactly how long it should remain in the furnace. It is his practice to mark the time of withdrawal on the door shelf, in chalk, when a charge is placed in the furnace.

Definite Heating Cycles Established in Advance

Complete time-temperature charts have been prepared for the various products by H. W. Kaspar, the metallurgist, who is also in charge of the heat-treating department. A definite number of pieces is placed in a pan or tray or racked up, preparatory to heat treatment, so that known quantities are dealt with. Preheating in ovens to a temperature of 750 deg. Fahr. followed by more rapid heating in the furnaces to the hardening temperature has resulted in decreasing the length of time the work must remain in the hardening furnace by 25 per cent. This system of heat treatment produces the following:

1. An accurate grain growth of the steel.
2. Definite physical grain structure.
3. Less oxidation or scaling of the work.
4. Elimination of decarbonization.

Black & Decker believes that when using electric heat, skilled heat-treaters are not required. The personnel of the heat treating department now consists of one furnace operator receiving 57c. an hr. (who formerly was a helper in the machine shop); one helper at 47c. an hr. (who assists the furnace operator by opening and closing the furnace doors while charging or discharging, and does most of the tempering), and one boy at 36c. an hr. (who racks up the work preparatory to heat treatment).

If fuel fired furnaces are used, it would be necessary to employ a heat treater at $1.25 per hr., in addition to the helper and boy, and it is questionable if one man could handle the work. The present furnace operator has his work so systematized that he can keep going at an easy gait all day and still handle a large quantity of small pieces. He is familiar with the various parts to be heat treated, and the length of time required, so all he has to think about is to mark the time of withdrawal on the furnace shelf, and then be there at that particular furnace at that time, for removing the charge. He has no valves to operate and no combustion to control. In fact, no judgment is required on the part of the operator as to whether the work is being heated properly. This labor saving at a minimum would amount to the difference between $1.25 and $0.57 for 275 hr., or $187 per month.

Quality Improved and Cost Reduced

Accuracy of the electric heat treatment (duplication of results) has saved through reducing the number of parts scrapped after being partly processed. For example,

FOUR of the Electric Furnaces in the Heat-Treating Room of the Black & Decker Co., for Heat-Treating the Parts of Its Portable Electric Tools. Each furnace is automatically controlled at the correct temperature, depending upon the product being heat treated. Each batch is in the furnace an exact length of time

one source of great annoyance and considerable loss was in the production of screw driver bits. The speed at which these bits operate has been steadily increasing year by year. Formerly a speed of 300 r.p.m. was standard; it is now up to 1000 r.p.m., and 1600 r.p.m. in special cases. Load tests are made on each screw driver bit by putting it in a chuck and subjecting it to a 50 per cent overload. Under this test, from 20 to 50 per cent of the bits used to fail, resulting in a complete loss; failure always took place by bending or breaking the bit end.

Through the use of electric heat, the metallurgist has been able to apply laboratory precision to the shop production, with the result that the failure of the screw driver bits has been reduced to one-half of one per cent, which figure may not be altogether due to heat treatment, but partly to slight irregularities in the composition of the steel. Total savings from this source alone have been so great that the price of the bit has been reduced 25 per cent, followed by an increase in sales from 20,000 to 75,000 bits per year. On the basis of the past production, and a minimum value of 25c. per scrapped bit, the yearly loss was $5,000, an amount in itself almost sufficient to pay for the new electric equipment in the heat-treating department.

THE 15-kw. hardening furnace has a hearth 12¾ in. wide by 28½ in. long and 8¼ in. high, and may be operated at temperatures as high as 1850 deg. Fahr. A sand seal is provided on the door to eliminate air leakage, and thereby produce a uniformity of temperature within the furnace otherwise very difficult to accomplish

Tangible advantages of electric heating to Black & Decker Co. may be summarized as follows:

1. A dependable product is produced.
2. Laboratory precision of heat treatment is secured.
3. Rejects due to all causes are less than one-half of one per cent.
4. The problem of heat treatment is entirely eliminated.
5. The metallurgist determines the time-temperature cycle of operation and the number of pieces per charge for the several hundred different parts; after this, the job of heat treatment becomes a mechanical one.
6. There has been no labor turnover in the last three years in the heat treating department.
7. The furnace operator's helper could take charge tomorrow and produce the same results without interruption of any kind.
8. The furnace operator says he has the best job in the plant, and is pleased with his working conditions.
9. The heat treating department is located in the same room with the rest of the plant, without any discomfort to the surrounding workmen.
10. Two girls, seated within 15 ft. of the furnaces, do all the testing on Rockwell machines, in perfect comfort.
11. The feeling of security in the product and in the heat-treating department, the dependability of results, and the continuity of service and flow of materials through the heat-treating department would justify the use of electric heat if the power cost many times what it does.

Production and Cost Data

Net saving in labor in the heat treating department per month	$187	
Net saving in scrappage per month	400	
Gross saving per month		$587
Cost of electricity per month	$115	
Former gas cost per month	80	
Increased cost of electricity over gas		35
Cost of electric furnaces installed	$6,000	
Fixed charges, 12 per cent per year	720	
Fixed charges per month		60
Net saving per month		$498
Annual net saving	$5,976	
Return on investment, per cent	100	
Operating months required to pay for complete installation	12	

Cast Iron with Nickel, Copper and Chromium

SOME investigations on certain gray irons to which have been added nickel, copper and chromium, similar to alloys which have recently received attention in the United States and England, are reported in the October, 1929, issue of the *Révue de Métallurgie*. The amount of nickel is between 13 and 15 per cent, with half that quantity of copper; up to about 3 per cent of chromium is added as a ferro.

These alloys are recognized as having a high resistance to various corrosive solutions and as being particularly stable under heat, while their mechanical properties may be varied within wide limits by changing the proportions of the alloying constituents. Although these cast alloys are of a much lower order of corrosion resistance than the high nickel-chrome steels, it is found that they resist attack better than any other alloy cast iron, and that the ease with which they may be machined and molded makes them an economical substitute, in cases, for brass and bronze.

Revamped Forging and Plating

High-Carbon Steel Bumpers Made and Chromium Plated on Mass-Production Basis—Much Labor Saving

By FRED L. PRENTISS*

DEMAND for more rapid production, and at the same time maintaining the high quality of the product and the desired high-luster finish and increased output without adding to the floor space have produced problems which have been successfully met at the automobile bumper plant of the Eaton Axle & Spring Co., Cleveland. About three years ago this company made various changes and improvements in its bumper plant, including the installation of new labor-saving machinery, to place its manufacture of bumpers on a mass production basis. The plant as then reequipped was described in THE IRON AGE, May 19, 1927. Other improvements recently have been made in this plant which indicate still further important progress in manufacturing methods.

Thorough inspection of plating work is regarded as of the utmost importance in the Eaton plant. The bumpers are given very careful inspections to satisfy present-day demands for high-quality chromium-plated work. First the plated members are inspected after nickel plating and buffing, this inspection taking place while the pieces are suspended on conveyors. A second inspection under artificial light regarded as best suited for that purpose is given after chromium plating. After final assembling the work is again inspected before being packed for shipment. To maintain a high standard and uniform quality of product, plating baths and operations are under laboratory control.

Universal adoption of chromium plating for bumpers in place of nickel plating has been the outstanding change in the manufacture of automobile bumpers in the past two or three years. In common with others manufacturers of chromium-plated parts, makers of bumpers had difficulties to overcome before chrome plating of good quality was put on a production basis. A bumper requires not only a dense coating of plating material, to avoid porosity, which causes corrosion, but also that the deposit should be thick enough to prevent abrasion; for if the coating is too light, there is danger that scratches will be made through the plating in the hard service to which bumpers frequently are subjected by automobiles bumping together.

Rust-Covered Bumpers Not Result of Poor Plating

Rust-covered bumpers are a common sight during the winter months, but this corrosion as a rule is not the result of poor plating. Rather, it is caused by the salt that is spread on the pavements to melt the snow and ice. This has the same effect on the plating as the salt spray, the use

*Resident editor of THE IRON AGE at Cleveland.

ENDS of Bumper Bars Are Carried Through a Specially Designed Heating Furnace on the Conveyor, for Heating Before Forming the Eye on Machine at Right

of which is the standard method of testing chromium and nickel plating.

Outstanding features of the Eaton plant, in the order of their sequence, include cleaning electrically in an acid solution which entirely replaces cleaning in tumbling barrels, various semi-automatic operations, automatic polishing, automatic plating and improved plating methods which have resulted in shortening the plating time cycle. For depositing the plate, 27 min. is required, from the time the tumbling barrels. In addition, pieces are sometimes distorted during tumbling and this danger is avoided by cleaning electrically.

Bumpers are made of high-carbon steel, having 0.80 to 0.95 per cent carbon. This is said to show rust more quickly than low-carbon steel, and requires a denser coating of plating than low-carbon steel. The chromium plating is applied to a thickness of 0.0006 in. The combined coating of nickel, copper and chromium is 0.0096 in. thick.

POLISHING Before Plating Is Done on Automatic Polishing Machines (Left). The work is carried on a conveyor under a series of polishing wheels. The picture shows two of these machines connected to one exhaust system

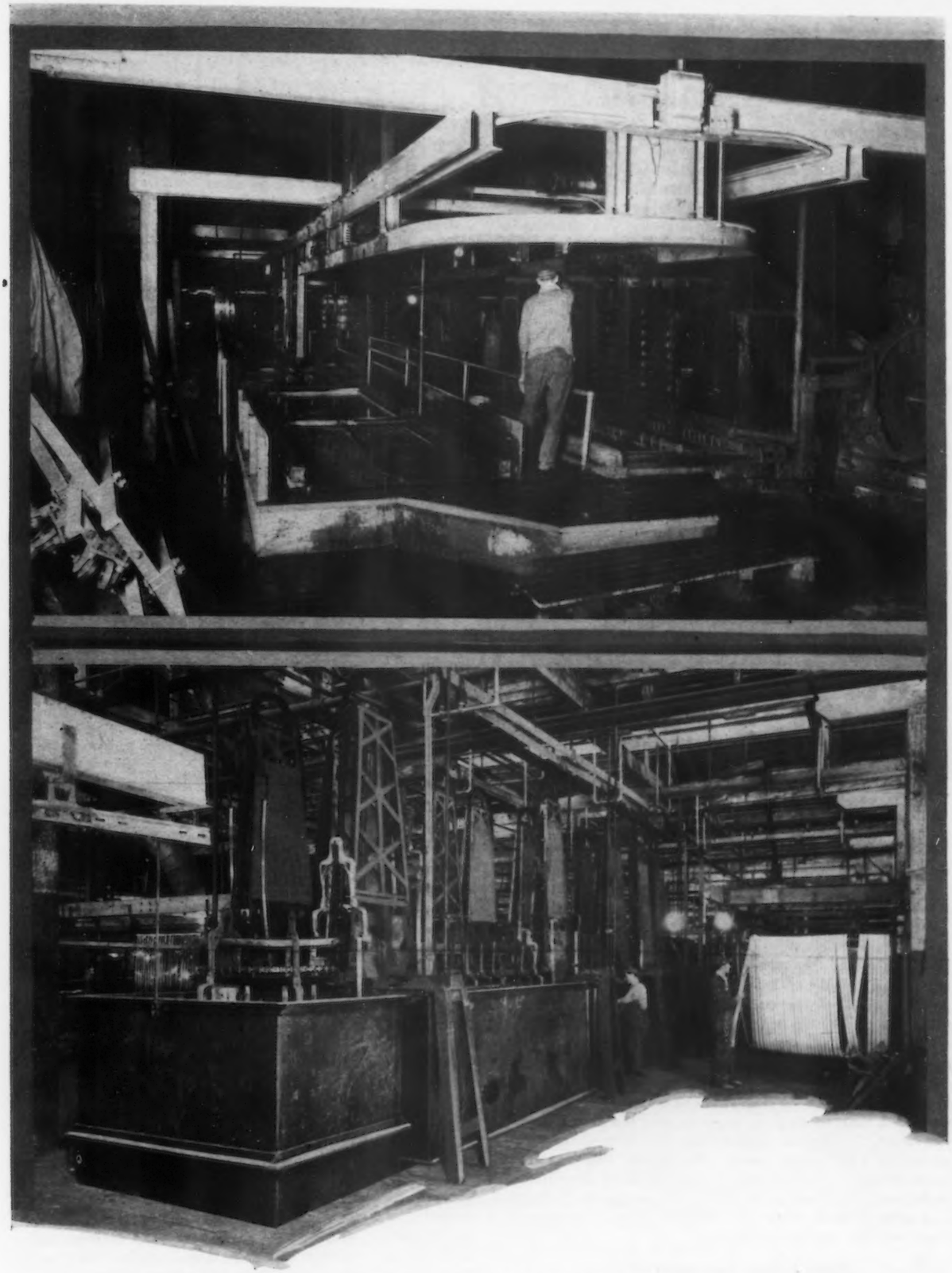
RAPIDITY with which Bumper Bar Parts Are Formed Has Been Increased by a Combined Unit (Right) of Five Machines, Provided for Turning Out One Type of Bar on a Production Basis. Five operations are performed on these machines without reheating the piece

work enters the first tank until it leaves the final nickel plating bath. A series of monorail conveyors carries the work through the various operations in the plating department, for the most part grouped on racks, and on to the assembly department, reducing to a minimum the handling of pieces by hand.

Cleaning electrically in a chemical solution after forming is found to have decided advantages over the former methods of mechanical cleaning. The work comes out of the cleaning tanks in a much cleaner condition than when cleaned by tumbling, being free from the fine ground-up scale which adheres to the work as it comes from the

Before the copper coating, usually the first coating in electroplating, is applied, the bumper bars are given a flash coating of nickel. The copper plating is followed by a final nickel coating. Then the pieces are buffed to give a bright finish, after which the chromium is applied. The nickel flash coat is less porous than copper and provides a dense deposit on the base metal.

If the copper undercoat were applied directly to the steel, it would be necessary to use a cyanide copper bath. But with the preliminary flash nickel coating an acid copper bath is used, permitting the bath to be operated at a higher current density than is possible with a cyanide



CHROMIUM Plating Unit (Top of Page), Where Pieces Hung on Racks Are Carried on a Monorail. The racks are handled in and out of the tanks by electric hoists which form sections of the monorail track. The manually operated nickel plating plant has similar handling equipment

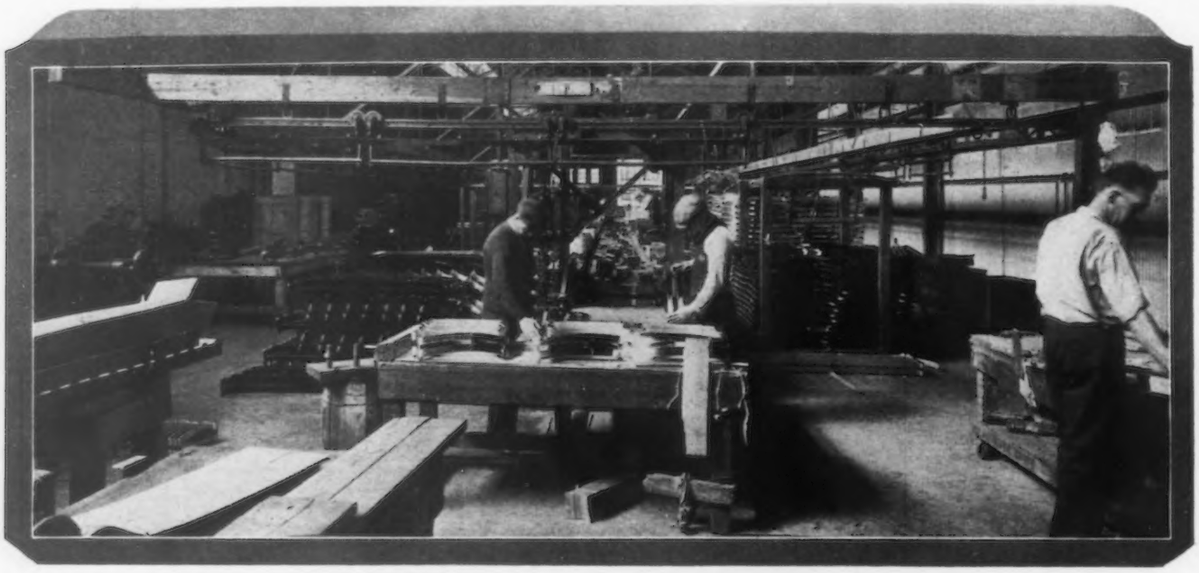
FULL-AUTOMATIC Machine in Which Bumper Bars Are Successively Cleaned, Flash Nickel Plated, Copper Plated and Finally Nickel Plated. The work is carried in and out of the various tanks on the continuous conveyor which loops above the tanks

bath. And the coating of copper which is deposited is thicker than would be deposited in the same length of time in a cyanide bath.

Automatic Cleaning and Plating

AFTER forming, the parts are electrically cleaned in a hot acid solution which removes the scale. From this they pass into a cold water rinse tank and then into another tank containing an alkaline solution. This further cleans the work and neutralizes any acid that may have not been removed in the rinse tank. The cleaning is done in an automatic machine.

Bars are suspended in a vertical position on hooks on a chain-type conveyor which loops up and down over the tanks, giving the pieces an immersion in each of the three tanks. The conveyor makes a circuit to the starting point, where the pieces are loaded on and unloaded from the conveyor by one man. He places two pieces at a time side by side on hooks on opposite sides of the conveyor, and takes off two clean pieces.



BUMPER Parts Are Carried to Assembly Department on Overhead Conveyor at Right and Are Placed in Storage Bins at Side of Conveyor. The bumpers are assembled at the side of conveyor, shown in center of picture, which delivers the assembled bumper to inspection table in foreground

From the automatic cleaning machine the bars go to the automatic polishing machine. This consists of a series of 14 wheels 15 in. diameter by 3 in. face, of various grains, starting with the roughing size and finishing with an oil wheel. A man feeding the machine sets the bar on a carrier which is slightly longer than the longest bar and moves on four small wheels. He shoves the carrier a short distance forward and it is gripped by a conveyor chain, which carries the work under the grinding wheels at a speed of 25 ft. a minute. If short bars are being polished two are put on the carrier.

Wheel Follows Contour of Piece

Each grinding wheel is direct driven by a motor, the shaft carrying the wheel on one end and the motor at the other being balanced by a counterweight. As the curved surface of the piece moves on the conveyor under the wheel, the latter moves up and down slightly with the change in the contour of the piece, but the wheel is always held against the bar being polished, with a uniform pressure of 25 to 30 lb. The speed of the polishing wheel is 1800 r.p.m., providing, with 14-in. diameter wheels, a peripheral speed of 6600 ft. a minute.

After passing the last polishing wheel the bar is removed and hung on a conveyor. The carrier is set on a track at the outer side of the machine and another conveyor carries it back to the loading end.

From the polishing machine the work goes to the plating department. Plating is done both in an automatic plating machine and in manually operated equipment. The automatic machine is used mostly for low-camber bars, as bars with deep camber are not so easy to handle on the automatic machine conveyor.

The tanks of the manually operated unit are arranged in two parallel rows. They are served by a monorail and electric hoists, the latter for handling the work in and out of the tanks. The monorail carries the bars down over one row of tanks and, making a turn at the end, returns over the second line of tanks.

On reaching this plating unit the bars are hung on racks which are specially designed for handling the various types of bars. The racks for the most part are made of copper, thoroughly insulated with insulating lacquer. About 40 bars are hung on a rack in a horizontal position. Those that have eye holes are strung on rods and held in place by a nut screwed on the end. At the other end of the rod is a hook by which it is hung on the rack.

Pass Through Cleaning Tanks on Racks

After racking, the bars pass through a series of tanks and operations which give a chemically clean surface, preparatory to receiving the flash nickel plate. They are then rinsed in cold water spray, and copper plated. After this they are given another cold water spray, and the final nickel plate is then applied.

In the automatic plating machine the operations are duplicates of those in the manually operated unit, except that scouring with pumice stone is omitted. The bars are hung vertically on hooks attached to the chain-type con-

(*Concluded on page* 1266)

More Mills Needed to Roll Copper Rods

Total Capacity Could Then Supply Demand on Single Shift Basis—Now Two Turns Barely Suffice

BY W. A. WOOD*

COPPER has been intimately associated with man from the Bronze Age of prehistoric times, and has since responded to his needs and comfort under all conditions of development. Whether it was the primitive cooking utensil of the open fire, the efficient sword, the bronze figure of art, or the copper sheathing of wooden ships, copper made its impress. It still retains its place in the larger and modern field made possible by the experiments of Faraday and the electric liberation of Edison and Bell.

The brass and copper fabricating industry in this country located in Waterbury, Conn., more than a century ago and from there radiated to the nearby towns of Torrington, Seymour, Ansonia and Bridgeport, all within what is known as the Naugatuck Valley. Naugatuck is to the copper industry what Pittsburgh is to the steel industry. However, due to the expansion of demand and to better transportation facilities by water, rail and truck, the industry is rapidly becoming dispersed among the industrial centers of the country.

Until the coming of the electrical era, copper and its alloys were used in forms of castings and the worked forms such as sheets, strips, rods and tubes, but had in reality a limited demand. Actually it was seriously curtailed when steel ships displaced wood vessels with their copper bottoms and, were it not for the electrical development, copper would have remained in a minor position and grown only with our regular commercial expansion in non-electrical fields.

An idea of the way the electrical industry now dominates the copper business may be had from the accompanying tabulation concerning the total copper consumed

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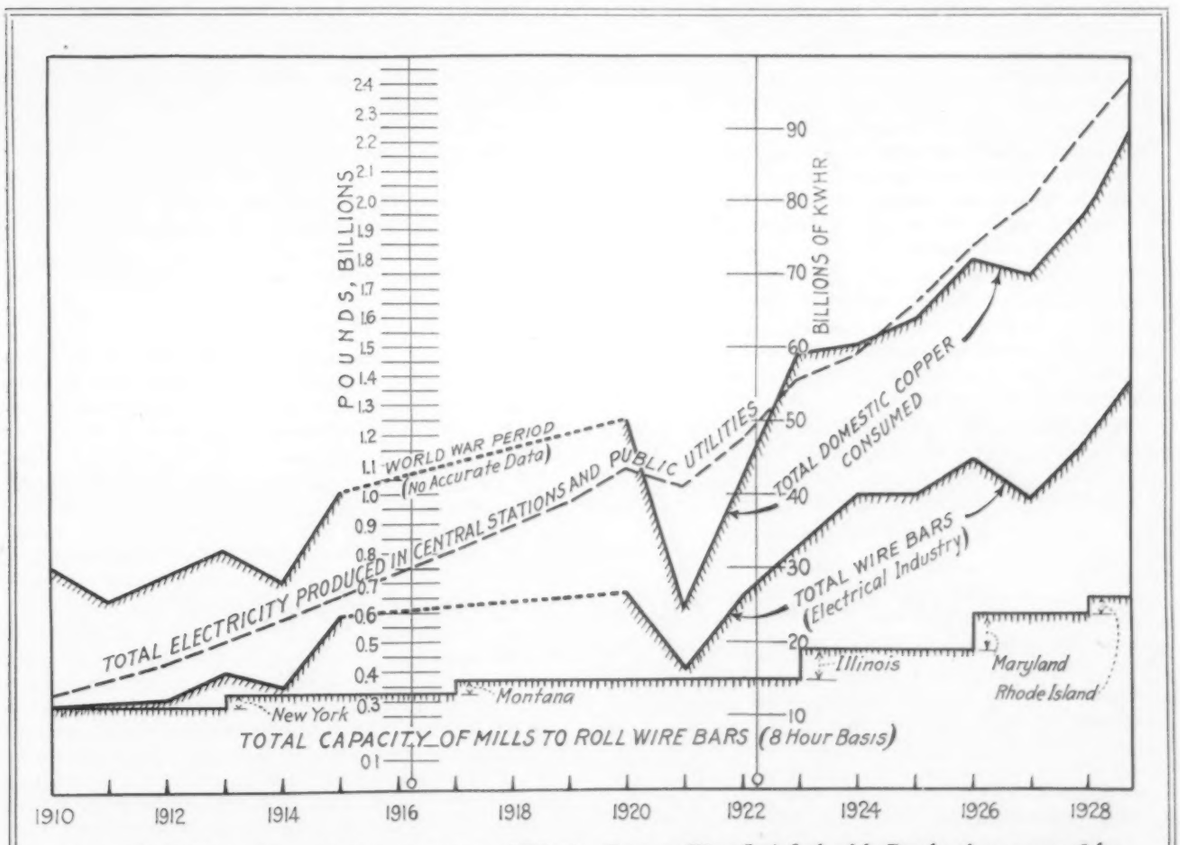


Since 1910, When Domestic Consumption of Virgin Copper Was Satisfied with Production on an 8-hr. Basis, Expansion Has Been so Rapid That Mills (with Additions in the Years Indicated) Were Operated in 1929 on a 16-hr. Basis. More mills, it is believed, should be built in the immediate future

or fabricated in the United States in the year 1929. In total it was 2,238,818,000 lb., approximately two and one-quarter billion, divided by percentage as follows:

Copper Consumption in United States in 1929

	Per Cent
Wire bars	63.33
Ingot bars	5.14
Ingots	3.44
Cakes	13.15
Cathodes	10.65
Bessemer	2.04
Other shapes	2.25
Total	100.00

In the period from 1912 to 1914 the consumption of copper per person in the United States was 8 lb. In 1922 to 1924 it was 12 lb. It is now 18 lb. per person. Every day we are made more and more conscious of our dependence on the use of copper, whether it is in the telephone, the electric light, the radio, the automobile, the rapid transit (air, rail and sea), or the many household conveniences.

Referring to the above list of percentages, we note that in the present consumption of copper the wire bar holds a position of 63.33 per cent. This percentage is increasing year by year and quite dominates the whole copper industry. The wire bar is made of copper having the highest electrical conductivity; most of it is produced by electrolytic refining. It is used for electrical purposes almost exclusively and its production is therefore an index of conditions of the electrical industry. The latter absorbs a number of other accessories made from cakes or ingot bars, and which if added to the figure of copper in wire bars would make the percentage absorbed by the electrical industry of 1929 approach 70 per cent.

Data on the Average Rod Mill

The wire bar is approximately 4½ in. square by 54 in. long, pointed stubly at each end, and weighs 240 lb. It is rolled hot at an initial temperature of 1450 deg. Fahr. into rods, principally ¼, 5/16 or ⅜ in. diameter. The mills in which they are rolled are known as "hot copper rod mills." They are electrically operated, and are fed by hand either from both sides or with looping devices of a semi-automatic character. Hot copper rod mills have capacities which range from 100 to 250 wire bars per hour, and deliver the product in coils.

Twenty-five years ago mills were entirely hand operated and used a wire bar weighing 175 lb., making 22 passes to a ¼-in. rod. The output was a maximum of 70 bars per hr. The modern mill can reduce a 240-lb. bar to a ¼-in. rod in 14 passes at much higher speed and with less labor.

The accompanying graph covers a period of 20 years and clearly illustrates the phenomenal growth of the electrical industry and the meager attempts of the manufacturers of copper products to keep pace. If under certain conditions of demand, the steel industry reports percentages of operation, the graph shows that under any conditions, the copper rolling industry on an 8-hr. shift must produce on more than a 100 per cent basis.

The upper curve is the total copper consumed within the United States. Paralleling it closely since 1922, and seemingly impervious to the effect of the violent fluctuations in other business, is the curve representing total electricity production. Lower than these two is the curve representing the production of wire bars (the electrical industry demand). The lower curve is the capacity of the mills to produce on an 8-hr. basis; it notes new mills on the year of erection.

Recent Additions to Rod Rolling Capacity

It will be noted that the wire bar curve is gradually reaching toward the upper curve. In 1910 it represented barely 50 per cent of the domestic consumption; now it is 63; it may, in a few years, become 90 per cent. This seems reasonable when we consider that the electrical industry has been approximately doubling itself every five years and is outdistancing all other industries using non-ferrous metal. At any rate, the relation between the wire bar curve and the curve representing the capacities of the mills to produce is very marked and clearly shows the need of more mills.

In 1910 the two curves coincided. In 1913 a mill was built in New York on the peak of a rising demand for wire bars. Between the low of 1914 and the low of 1921 a mill was built in Great Falls, Mont., primarily to produce rods and wire to electrify the Milwaukee railroad over the Rocky Mountains. This covered the war period and its immediate after effect.

During the period from the low of 1921 to the great high of 1929 several mills were built, bringing the mill capacities up to approximately 50 per cent of the total consumption of wire bar, against 100 per cent in 1910. In other words, in 1910 the mills were on an 8-hr. basis; in 1929 on a 16-hr. basis. There is an unmistakable indication that more mills should be built in the immediate future.

Such new mills as are built should be intelligently located as to water and rail facilities and to domestic and foreign demand. The following locations should be considered: Camden, N. J., Houston, Tex., El Paso, Tex., Los Angeles, Cal., and Cleveland. Each one of these locations has been studied and shows distinct strategic advantages.

Electrification programs of the railroads will be a large factor in the further expansion of the electrical industry. Europe is also making great strides in electrification, especially in Italy. Russia has a program of a large magnitude.

These are all factors affecting our own copper industry and promise well for the future.

Blast Furnace Filling and Size Segregation

SIZE segregation is recognized as an important factor in blast furnace practice because it results in irregular gas flow. In using fine lake ores it appears that operators are forced to make some sacrifice in gas distribution in order to obtain regular stock movement with fast blowing. A definite correlation between methods of filling and size segregation should lead to more positive means of controlling gas distribution.

The North Central station of the United States Bureau of Mines, Minneapolis, has recently completed a series of experiments, made in cooperation with the University of Minnesota, to determine by means of small models the trend in size distribution that result from changes in filling. A close stock line, larger bell angle, larger charges, greater speed and greater bell drop, in fact any change that results in more rapid discharge from the big bell onto the stock line, tends to decrease the average particle-size at the center or make the central area more dense. Charging coke on the big bell first, alternating ships of ore and coke, smaller charges of ore and coke and smaller bell clearance tend to produce a more open center.

It is concluded that measurements of gas temperature, gas velocity and gas composition, all of which are indexes of gas distribution, furnish a direct method of attacking distribution problems that must be worked out for individual furnaces.

Deoxidation in the Making of Steel

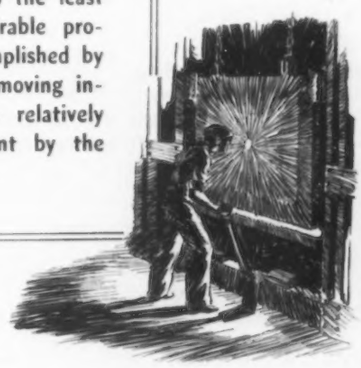
Consideration of Use of Oxidizing Agents and What Is Expected of Them—Blow-Holes vs. Pipes

BY JOSEPH R. MILLER*

HE who makes use of steel may well pay some attention to understanding the methods employed in its refinement. Qualities apart from those dependent upon composition, originating in the steelmaking processes remain thereafter with the product. They thus constitute, so to speak, a character which must be reckoned with in relation to its fabrication and subsequent service.

Thus certain metallurgists who deal especially with intricate heat treatments are wont to place an importance on knowing the individual sources of the steel, in addition to knowing its chemical analysis. While the sources of these characteristics are many and complex, one of the important factors is that represented by the deoxidizing procedure in the finishing of the melt.

LIMITING internal cavities in steel to a minimum, and then putting those cavities which remain in position to do the least harm, is a most desirable procedure. This is accomplished by proper methods for removing injurious oxides and is relatively easy of accomplishment by the skilled steel melter.



Since there is great diversity in practice with regard to the amount of deoxidation considered necessary and the means of effecting this required cleansing, it is natural that there should be an interest taken in the effects upon the product, and criticism be offered of the steel makers' methods by people outside the mills often not well informed.

To Remove Injurious Forms of Oxide

The legitimate function of a deoxidizing agent in finishing a melt is to remove injurious forms of iron oxide residual from a normal steel-making process. Steel may be made, by certain methods, so carefully that the residuum is a minimum, and thus very small amounts of any deoxidizer will be required for such melts. This procedure, however, is difficult and expensive, both in the time required and because of the high quality of the raw materials which must be used. Steel may be regularly made that requires not more than a normal amount of deoxidizers, and it is this condition which is sought after in general practice.

Frequently carelessness in manipulation, or the employment of processes in making the steel which do not permit normal reactions, result in steel that requires an excessive amount of the agents for deoxidation. Two dangers exist under such conditions: First, that a sufficient amount of the deoxidizers may not be added or that the action may not properly take place; second, that the products of the deoxidation (viz., the oxides of the elements of the deoxidizers) may in themselves, in such large quantities, prove detrimental to the steel when it is to be used for certain purposes, or in a general way lower the quality of the product.

Those who have habitually to deal with methods and practices in steel making which yield melts requiring large amounts of various deoxidizers become skillful in the application of these agents and can bring out such melts in a uniform condition, without irregularities in the composition and with a passable degree of thoroughness of deoxidation. Many such melts have been made which have passed all the requirements expected of the material in subsequent fabrication and service.

However, while the elimination of the oxides residual from deoxidizing reactions is highly desirable, it is doubtful that it is ever brought about in any thorough degree, regardless of the nature of the oxides produced. For this reason where such oxides, or the interspaces from their occupation, are detrimental in a definite way for any certain product it is desirable that the steel be so made that a normal amount of deoxidizer may be sufficient to satisfy it.

Recognizing this fact, the steelmaker diverts from such a requirement any melts which require much deoxidation. Also he is apt to bring out such special orders on furnaces where a preferred practice can be followed out. It is this feature most particularly which makes it desirable that the steel maker be informed as to the uses or methods of fabrication in connection with his product.

Formation of Blow-Holes

In the mild "rimming" steel the gaseous oxides are partially eliminated by effervescence, which process is aided sometimes by rodding. However, as the ingot freezes a certain greater or less amount of the gas is entrapped, resulting in blow-holes, the distribution and size of which determine their importance. These reduce the density and continuity of the steel fabric and under certain conditions arising in subsequent working become defects in the product.

Blow-holes, however, operate to reduce the central cavity or pipe and thus more of the ingot may be considered sound. Practice in teeming is regulated to seat these blow-holes well within the outer skin of the ingot, so that they may not appear as surface defects in rolling or in later machining operations.

In addition to these there is often solid residuum from

*245 Melwood Street, Pittsburgh.

additions for active deoxidation, necessary besides that anticipated from the natural effect of decarbonization. In properly made rimming heats this is mostly absent or is a minimum, and it is small in quantity even in unusual cases. It is better to have this condition, as an excess of blow-holes is more detrimental than a normal amount of the solid oxides.

In capping or top freezing, as often practised, attempt is made to reduce the size of the blow-hole by means of pressure. Thus a similar result is attained without effervescence (or elimination of the gaseous oxides). Top freezing is usually accomplished by the use of necked top molds and keyed caps, but sometimes powdered silicon or shot aluminum is used in the top quarter of the ingot and the caps then need not be keyed. In either case dependence is placed on the use of greater amounts of active deoxidizers than is customary with "rimmed" steel.

The higher carbon steels are often full killed, so that no gaseous elimination takes place. In that case the solid oxides must be reckoned with rather than blow-holes. Thus deeper pipe results and less sound steel from the ingot, but with fewer blow-holes.

The contribution made by a certain procedure, in finishing and deoxidizing, to the character of the steel so produced is largely that involving the nature and size as well as the amount of the oxides left entrapped in the steel. These particles also produce certain effects in the crystallization of the ingot. Certain of these effects upon crystallization are as persistent as the presence of the blow-holes and sonims.

Disadvantages May Be Overcome

That the bad effects of these characteristics can be grossly exaggerated is witnessed by the fact that steel is often made under adverse conditions, requiring an exceptional amount of deoxidation, and has been applied successfully for practically all usual purposes. It is to be remembered that, when not deoxidized in one way or another, the ingots will not roll in the mill; also, that much of the steel which is actually bad is stopped at the point of blooming, because of the development of defects. Here is a sifting process which automatically throws much of the burden upon the steel producer.

At the same time a study of these oxides and peculiarities in the crystallizations, as they exist in the steel when it is subject to fabrication and test, would if properly made yield most valuable information, particularly for guiding the mills in the proper and economical application of melts to orders. It will be better to attack the problem from this angle than to try to set up standards by which to judge a melt, without a knowledge of how it was made, as it would seem that many are not sufficiently familiar with this phase of testing to make proper decisions.

Rail Breakages, and Experiments with Heat-Treated Rails

ABOUT 500 rails of 127 to 136-lb. section were heat treated during 1928 at the Steelton plant of Bethlehem Steel Co. and laid in tracks of six Eastern railroads. These were taken singly from the last pass during regular rollings and quenched in water for 25 to 30 sec., and immediately drawn at 1000 deg. Fahr. for 90 min. In the year previous a few dozen 130-lb. rails were heat treated at the Edgar Thomson Works of Carnegie Steel Co. These were cold rails, reheated to 1500 deg. Fahr., quenched in oil for 20 min., and immediately drawn at 900 deg.

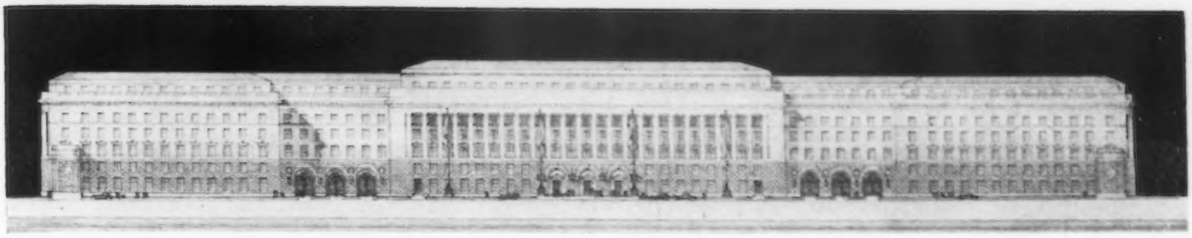
In addition to these, about 300 rails of 130-lb. section were heat treated in various similar ways for the Pennsylvania Railroad at the two mills mentioned above, and laid in track contiguous to standard rails from the same rolling. The object has been, according to W. C. Cushing's* remarks before the recent meeting of the American Railway Engineering Association, to attempt to secure a "material of superior physical qualities, greater than displayed by any of the 19 materials or methods tried in the tracks of the Pennsylvania Railroad within the last 30 years."

While data are still being accumulated, Mr. Cushing believes that heat treated rails must be made from sounder, cleaner and more uniform metal than is now ordinarily found in steel rails. With superior metal, heat treatment will increase the elastic limit 60 per cent, increase the ultimate strength and endurance limit 25 per cent, increase the elongation 35 per cent and reduction of area 140 per cent, and improve the hardness, wear and deformation resistance somewhere between 20 to 36 per cent. These figures of improvement are not only over the standard carbon steel as rolled under usual rail-mill practice, but represent the corresponding gain over any alloy or special mode of manufacture tried. The latter include alloy steels (high silicon, nickel, nickel-chromium, manganese, copper, molybdenum and molybdenum-copper), alloy treated steels (titanium, vanadium, aluminum), electric steel, Sandberg sorbitic rails, and special process manufacture (low-temperature finishing, sink-head ingots, reheated blooms, unstraightened rails and roller straightened).

Rail failures reported annually to the American Railway Engineering Association showed a gratifying decrease in numbers prior to the war, but have been little improved since that time. About one-third of the breakages may be ascribed to poor maintenance of ties and ballast, but the remainder are primarily due to a combination of segregated or unsound metal and the heavy stresses of high speed traffic. Variations in the metallurgical structure of rail may originate in so many places during the manufacturing operations that the association has voted a five-year research into the problem. It is proposed to manufacture several thousand tons of high carbon steel, roll it into rail and install it in track under the most minute observation and constant supervision, reserving a considerable percentage of the rails for appropriate laboratory study and comparison with their worn mates as removed from the track. Railroads and rail manufacturers have been asked to underwrite the program to the extent of $50,000 a year.

*Mr. Cushing is engineer of standards in the engineering department, Pennsylvania Railroad, Philadelphia.

Although at least 4000 investigations on corrosion have been made and published, the question is still in a chaotic state, said Albert Portevin in a lecture dealing exclusively with the subject of the corrosion of metals and their alloys, delivered recently before the Conservatoire des Arts et Metiers in Paris. All the industrial base metals are chemically unstable in the presence of oxygen and acids, and their only chance of survival is afforded by the protecting coat formed during early corrosion. The most interesting metals, showing the phenomena of protective coats, are aluminum, nickel and cobalt.



Temple of Commerce Nears Completion

THE magnificent new Department of Commerce building on Fifteenth Street south of Pennsylvania Avenue in Washington is being pushed to completion and will be ready for occupancy earlier than had been anticipated. While it is not definitely known when Secretary of Commerce Lamont will be able to move into the new quarters, it is expected that it will be some time in September when the first section will be occupied.

Classic in design, this new monument to American business and industry will rank in size with the great office buildings and public structures of the world. Occupying three complete city blocks, its length, according to an official description of the building, is 1050 ft., exceeding that of the United States Capitol by 300 ft., though its width, 325 ft., is 25 ft. less. It is also longer than the British Houses of Parliament by 110 ft., though not so wide. The land area occupied is about 345,000 sq. ft., nearly eight acres. The building is seven stories high and with its southwest corner at Fifteenth and B Streets, N. W., it looks southward over the grounds of the Washington monument and westward over the park lying south of the White House.

The structure itself is of monumental type, but is characterized by great simplicity of treatment. Almost the only ornamentation is the central group of 24 columns on the east facade and four porticos with four columns each on the west. Both north and south ends are relieved by a portico and a group of 14 columns. Triple-arched gateways, two stories high, give direct access through the building to the interior courts, where C Street and D Street originally ran, but above the gates the structural mass is carried solidly, making the edifice outwardly an unbroken unit.

The building is, in effect, three complete rectangular buildings in one, the central part being longer than those on either wing. This large rectangle has an interior wing running east and west the full height of the structure, dividing the area into two courts. A single large court is maintained above the first floor in each of the rectangles forming the end structures, a provision of space for expansion in the future.

The net floor area provided within the entire building is 1,092,800 sq. ft., sufficient to accommodate all branches of the department except the Bureau of Standards, which is housed in specially constructed buildings in the suburban district of Washington.

In the course of his address at the laying of the corner stone of the building on June 10, 1929, Secretary Lamont described the building as "a temple of truth, dedicated to enlarging the science as well as the practice of business." Into the building will continue to pour, he said, facts and figures from every State and every foreign country to be analyzed, classified, combined and compared. Sources and markets for raw material will be investigated and reported, he pointed out, and new outlets will be found for manufactured goods.

"If, through the activities of this organization (Department of Commerce), working in cooperation with American industry and commerce, continued progress can be made in simplification, standardization, elimination of wastes in manufacturing and selling, then costs and selling prices can be further reduced and markets widened," he said. "If our great quantity-production industries, which have been keyed up to vast output to supply the first-hand home markets, can find constantly expanding foreign outlets to take care of surpluses as home markets gradually shift to requisites for replacement, then present employment schedules and wages can be maintained.

"Then at last that magic combination, discovered within the last decade, of high wages, low costs, and fair profits, can go on because we are only 6 per cent of the population of the world, because we occupy only 5 per cent of its habitable area and because slowly but surely the living standards of other peoples will tend to rise to the level of our own, thereby steadily enlarging the markets for our products for generations to come."

The New Department of Commerce Building (View as work was starting on the wings), Looks Westward Over the Park Lying South of the White House. The structure covers eight acres

Tube Mill of Flexible Design

Standard Pipe Lengths or Shorter Conduit Cut Without Rehandling—Natural Gas Gives Quick Heating

A NEW tube mill having an annual capacity of 45,000 tons of butt-welded pipe has been put in operation by the Laclede Steel Co. at its Alton, Ill., works. This new unit is known as the Laclede Tube Co. Among the features of this plant are the use of natural gas in the skelp-heating furnace; building construction so that skylights supplant most of the side-wall sash usually found in similar structures; a combination sewer and pipe tunnel; and a demountable saw which is used to cut conduit to 10-ft. lengths without rehandling.

Both standard and extra-heavy pipe of either Bessemer or open-hearth steel is being made. Galvanized pipe is produced by the hot-dip method and conduit is enameled in a special department.

Layout of this plant is such that production can be doubled in the producing end of the mill by adding units in the present building, which is built in the form of a letter "H." Each leg of the "H" is 300 ft. long, with a crane span of 105 ft. The cross-bar of the "H" has the same crane span of 105 ft. and a length of 180 ft. This arrangement made it possible to have all cranes duplicates.

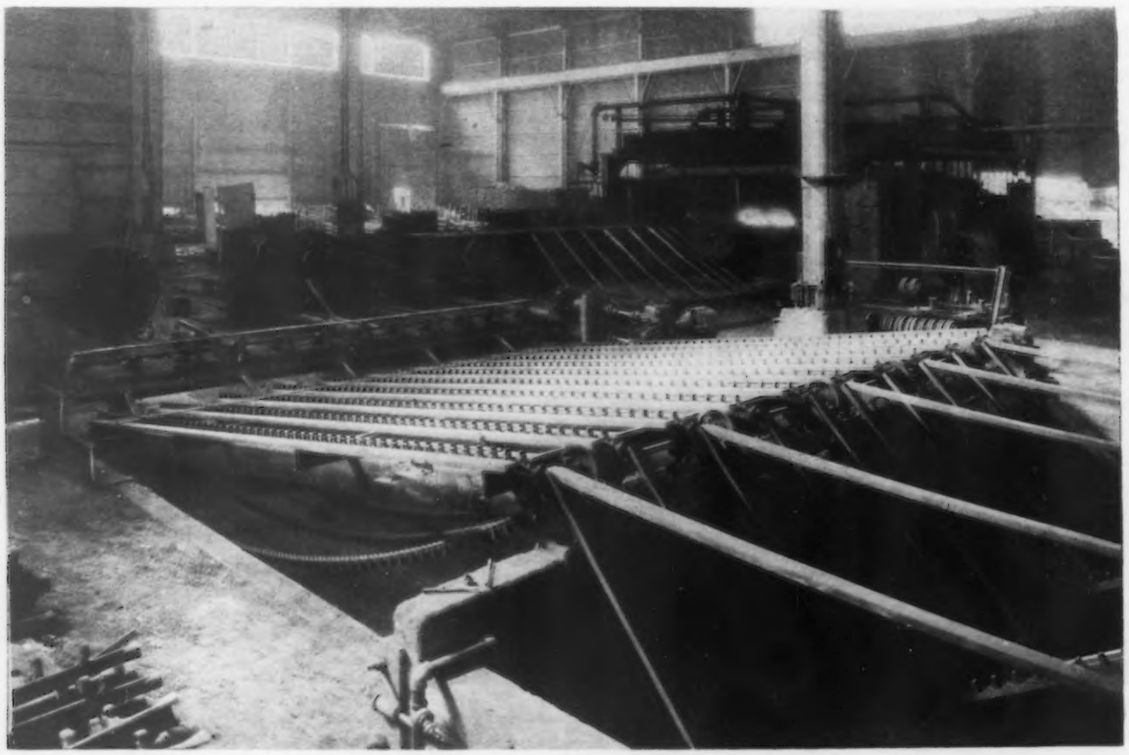
The central part or cross-bar section of the building, with its major axis north and south, contains the greater part of the production equipment. The north leg of the "H" is the skelp warehouse and contains the "clipping" shear and the furnace. The walls are of corrugated galvanized sheets, with several lengths of sash at the ends. Liberal use has been made of corrugated glass in the roof, so there is no lack of daylight inside.

Louisiana Natural Gas Used for Furnace

FIRED by natural gas drawn from the mains of the Mississippi River Fuel Co., which reach Alton from the Louisiana fields, the skelp furnace is practically 25 ft. x 25 ft. overall dimensions, with a 10½-ft. width of hearth. It is of the regenerative type, with somewhat narrower chambers than usual, and a deeper hearth than is found in regular practice.

The beneficial effect of this design is evidenced by a low exhaust gas temperature and a quick-acting furnace. It has been demonstrated already that it is possible to heat 10 tons of skelp an hour under proper reducing atmospheric conditions. Gas pressure in the mains is 70 lb. per sq. in. This pressure is reduced to 25 lb. at the enameling ovens, 15 lb. at the galvanizing pot and 15 oz. at the skelp heating-furnace burners.

A charging machine of standard design, by Taylor-Wilson Mfg. Co., McKees Rocks, Pa., uses magnetic rolls for moving the skelp into the furnace. The drawbench and



GENERAL View of Mill (page 1226); the Quench Tank in Foreground May Be By-passed by Using Removable Skids. In background is the skelp furnace. Above are the seven tanks of the pickling room, served by an overhead crane. At right, the rigs for handling tubes vertically through the enameling ovens are shown

skids were built largely by the Laclede Steel Co. from its own drawings, and in so far as possible of standard parts. One feature of the drawbench is that the chain is driven by a constant-speed motor and there is no gear box. To change speeds it is necessary only to change gears, which can be done while the remainder of the mill is being changed over. The size rolls immediately follow the drawbench.

Cooling rack delivery of tubes to the cross-roll approach conveyor is in one of two ways. Either tubes go directly down a structural incline to the conveyor, or the inclined supports are removed and the pipe is dropped at this point into a quenching tank located under the incline, and from which tubes are again picked out by conveyor chains and delivered to the approach to the cross rolls.

Cross rolls, of which there is one set, are driven by special 7½-hp. Crocker-Wheeler motors with built-in reducing units of the planetary type. After the cross rolls are the usual conveyors and three saws, so arranged that standard pipe lengths can be cut; or a center saw can be put into use, which enables the operators to cut conduit in the regular line of production. It has been found practicable, from a commercial viewpoint, to do this and keep well within standard tolerances, making it unnecessary to handle conduit again before the threading operation.

Threading equipment consists of eight standard Landis machines. Seven are in production on sizes from ¼ in. to 6 in. and one larger cut-off and threading machine handles pipe from 12 in. down to 6 in.

Rehandling of Pipe Avoided

ARRANGEMENT of the mill is such that pipe is delivered in lifts from cradles at the end of the production line directly to the threading machine racks or skids; and is delivered from the threaders directly into the warehouse, thereby eliminating a transfer operation.

Pickling facilities consist of seven 25-ft. tubs using the regular sulphuric acid and a tank for hydrochloric acid. The latter is used particularly for pipe which has been through the sulphuric acid bath, but which is later to be galvanized. The tanks are set on timbers on a concrete floor, covered with an acid-resisting material. The floor slopes to a common drain.

A galvanizing tank, furnished by the Surface Combustion Co., Toledo, Ohio, and located adjacent to the pickle department, is 25 ft. long, 3 ft. wide and 4 ft. deep. It is heated with natural gas through 16 burners, the temperature being regulated by a Leeds & Northrup thermostatic recording control.

"Drag out" on the galvanizing tank operates through a blowing ring over magnetic rolls which are set at an incline. At the end of the incline is a device which auto-

(*Concluded on page* 1265)

Report Business "Fair to Good"

National Metal Trades Association Members Announce Result of Survey of 600 Plants at Annual Convention

THE National Metal Trades Association, which held its thirty-second annual convention at the Hotel Astor, New York, last week, reported that a survey of 600 manufacturing plants which are members of the organization disclosed that 77 per cent reported business to be "fair to very good" and 33 per cent stated that their business is as good as or better than that of last year.

A two-day meeting was well filled with discussions of various topics of pertinent interest by well-known industrial leaders.

Sam A. Lewisohn, vice-president of the Miami Copper Co., offered suggestions for the stabilization of employment; Alfred Reeves, general manager of the National Automobile Chamber of Commerce, discussed the present situation in the automobile industry; George E. Roberts, vice-president of the National City Bank of New York, surveyed the conditions which bring about the recurring periods of depression in business; L. F. Loree, president, Delaware & Hudson Railroad, gave an account of the personnel work that has brought about a great reduction in labor turnover on this railroad; E. K. Hall, vice-president, American Telephone & Telegraph Co., talked on the personnel relations of the telephone company with its employees. Some of these addresses are given in part elsewhere in this issue.

Other speakers were Representative Albert H. Vestal, who told his audience of the difficulties which surround the passing of legislation in Congress; Commander Ellsberg, formerly of the United States Navy, who related the stirring story of the raising of the submarine S-51; Walter Gordon Merritt, counsel, League for Industrial Rights, who discussed the effect on industry of the union labor restrictions in the building trades of New York City; Harold Falk, the Falk Corporation, Milwaukee, who reported on the work that is being done to foster industrial education; and Prof. George Baerg of Wesleyan University, who told of his experiences in Russia. Floyd Gibbons, former war correspondent, who has interested a vast audience on the radio with his stories of "headline hunting," was the sole speaker at the banquet Wednesday evening.

J. G. Benedict new President

The association elected the following new slate of officers:

President: J. G. Benedict, general manager, Landis Machine Co., Waynesboro, Pa.

First vice-president: Jacob D. Cox, Jr., president, Cleveland Twist Drill Co., Cleveland.

Second vice-president: Harry C. Beaver, vice-president and treasurer, Rolls-Royce of America, Inc., Springfield, Mass.

Treasurer: John W. O'Leary, president, Arthur J. O'Leary & Son Co., Chicago.

Councillors for Two Years: F. J. Shepard, Jr., treasurer, Lewis-Shepard Co., Boston; H. F. Wahr, president, Mesta Machine Co., Pittsburgh; Angus S. Macdonald, president, Snead & Co., Jersey City, N. J.; E. C. Bayerlein, vice-president and treasurer, Nordberg Mfg. Co., Milwaukee;

J. G. Benedict

C. R. Gardinor, president, International Silver Co., Meriden, Conn.; Harold C. Smith, president, Illinois Tool Works, Chicago.

Problems call for Leadership

Harold C. Smith, Illinois Tool Works, Chicago, the retiring president, in his address to the convention covered thoroughly the various activities of the association during the year, and concluded with the statement that today's industrial problems, embracing chiefly scientific distribution and the improvement of industrial relations, "call for an industrial leadership and a capacity for team work beyond the requirements of any previous time."

One of the important branches of the association's activity is industrial education work. On this subject, Harold C. Falk, the Falk Corporation, Milwaukee, in dwelling upon the advantages to be derived by every manufacturing company in developing work of this kind, said that "our industry should become as highly organized in its personnel work as in the other normal departments of a business organization."

Mr. Hall in his address said that the foundation of a successful personnel policy is to make the worker feel that he belongs to the industry. He must feel a sense of growth. There must be opportunities for promotion. There comes a time in every man's work when he feels he can go no further; he is at a dead level. This, Mr. Hall said, is one of the most difficult problems to deal with. One way is to help him to save his money during the early part of his working years, so that when he has reached that dead level which comes to the average employee he has a growing interest fund, which replaces to some extent the discontent that follows a realization that no further promotion or further earning capacity is in sight for him.

Other suggestions were: Stop coddling workmen, stop treating them like hired men, avoid ignoring their rights and their opinions, give them an opportunity to be heard, give them information about your business.

A happy state of mind, not high wages, brings efficiency into an organization, he said. Driving men is "old stuff." Leadership is what counts. Give men an opportunity to discuss with management their own relation to the business; give them a chance to assume responsibility; use power and authority with intelligence and consideration for rights and feelings.

Steel Treaters to Meet at Cornell University

Two hundred members of the American Society for Steel Treating have announced their intention to attend a joint meeting of the society's Syracuse, Rochester and Southern Tier chapters at Ithaca, N. Y., on Friday, April 25.

The afternoon will be devoted to visiting Sibley College of Cornell University. The laboratory, class rooms and library equipment will be studied. In the evening a dinner will be served at Willard Straight Hall.

Dean Dexter Kimball will deliver the address of welcome to the steel treaters, to which R. G. Guthrie, Chicago, president of the society, will respond. Other scheduled dinner speakers are Profs. A. C. Davis and H. Diederichs of Cornell; J. M. Watson, Detroit, vice-president of the society; W. H. Eisenman, secretary, and R. M. Bird and F. G. Hughes, past presidents.

The main speech of the evening will be delivered by Capt. Ed. J. House, United States Army Air Corps, who will discuss "Developments in Military Aviation." A further feature will be the showing of a moving picture of the Army Air Corps, loaned by the government.

Theodore L. Dodd & Co., 80 East Jackson Boulevard, Chicago, have been appointed Western sales representatives for the Indiana Pressed Steel Co., Muncie, Ind., manufacturer of stampings.

Named in honor of Thomas W. Lamont, a director of the United States Steel Corporation, a 604-ft. lake freight boat that is being built for the Pittsburgh Steamship Co. was launched at the yards of the Toledo Shipbuilding Co., March 22.

Business Reactions Occur Naturally

Relapses From Prosperity a Result of Our Complex Industrial Organization—Labor Shares Responsibility in Maintaining Equilibrium

BY GEORGE E. ROBERTS*

INDUSTRIES are always undergoing improvement, new industries are always developing, and the shares of the respective industries in the total volume of trade are always changing, not at anybody's command or dictation, but as the result of new discoveries and inventions and to suit the tastes and wants of the people. These changes affect the equilibrium of industry, they require shifts of employment, they destroy the value of particular trades and of particular investments alike.

It is not true that the burden of changes falls upon the wage earners alone. Every dollar's worth of industrial equipment is undergoing constant depreciation, not simply from wear and tear but from obsolescence. It may be difficult for an individual worker to learn a new trade or shift from one industry to another, but what can be done with old equipment except to scrap it?

Every Cost Reduction Releases New Buying Power

THESE changes as a rule have so many counteracting influences that they take place without general disturbance of prosperity. Labor released from a declining industry is wanted in another which is expanding, as when the carriage gave way to the automobile. Nevertheless, readjustments are sometimes costly, but through and by them all society is carried forward to higher levels of living conditions than had been known before.

The cry that labor is displaced by improved methods has been heard for more than a hundred years, but such unemployment is not lasting. How can it be? Every reduction of costs and prices releases an exactly corresponding amount of purchasing power for other uses, and it is promptly used in some way. The idea that the hours of labor should be reduced as a permanent policy in order to distribute a limited amount of work is refuted and condemned by experience and common sense. The idea that people need more leisure in order to find ways of spending their incomes also lacks support, so far as my observation goes.

The growth of installment selling indicates that the opportunities for spending are still keeping well ahead of the average income. The argument for a reduction of the hours of labor must rest upon other uses for time than in either earning or spending, and the answer is in whether the wage earner would rather have more leisure or more things.

It is not true that labor or the average consumer has been placed in a worse position by the changes in industrial or business methods of the last 20 or 30 years. The evidence is that capital, management and invention to a great extent, have prevented the rise of prices, which, without their services, must have resulted from the rise of wages which has occurred in that time. I venture to say that not one industrial product can be named which has advanced in price as much as the wage rates of the labor that enters into it.

Some Opinions By George E. Roberts

¶ Not true that the burden of industrial changes falls upon wage earners alone

* * *

¶ Every reduction of costs and prices releases purchasing power for other uses

* * *

¶ In prosperity industry loses fine adjustment of relationships necessary to stability

* * *

¶ Labor is not without responsibility in task of maintaining industrial equilibrium

* * *

¶ Labor does not have the power to get more wages out of any business than the business can pay

George E. Roberts

Prosperity Fosters Miscalculated Expansion

IT is natural in boom times for the industries which are employing their full capacity to put their surplus earnings into extensions of capacity, perhaps going into debt besides. It is natural also under the stimulus of prosperity to enlarge the organizations, plan more expensive sales campaigns, increase salaries and wages and in general establish the business on a higher basis of expenditures, and this policy when generally adopted tends to raise prices and seems to enhance prosperity. The rising spirit of optimism induces speculation, which is based on anticipations, and which is so infectious that it may pervade the community and exert an influence injurious to regular business in many ways.

As a result of such conditions, industry loses the fine adjustment of relationships which we have seen is necessary to stability. An increased volume of production may not be wanted in the same proportions as the former volume was wanted. As for example, the consumption of wheat per capita is not as large as 30 years ago, and when the population has enough of foodstuffs, an increase of purchasing power goes for something else. Thus, the boom period commits errors of calculation, which have to be corrected, and a period of recession is a period of readjustment and reorganization.

The situation will soon clear itself and recover its equilibrium by the free play of economic forces, if those forces are not counteracted and baffled by arbitrary interference. Unfortunately, there are always demands for interference and for the establishment of some authority over the economic law. To whatever extent such efforts are successful they prolong the depression.

The agitation on the subject of unemployment is mainly in the name of labor. It is true that labor

*Vice-president, National City Bank of New York. The article here presented is from an address before the National Metal Trades Association, April 16, Hotel Astor, New York.

suffers direfully, and it would be wrong to make light of its sufferings, but labor is not without responsibility in the task of maintaining the industrial equilibrium. Labor is as great a factor in that task as capital. Wages, first and last, are by far the major factor in the costs and selling prices of all the commodities of trade.

Capital can do nothing without the cooperation of labor, nor can it long do anything in industry without a margin of profit. That margin normally is exceedingly small and often losses take its place. If organized labor in pursuance of over-zealous and shortsighted policies make demands either for wages which cannot be paid, or for conditions which unnecessarily and uneconomically increase the costs of production, it may cause a deadlock, or even if successful it will lessen the purchasing power of the entire population and thereby lessen the earnings of its own members.

The responsibility for maintaining stability in industry does not rest wholly upon capital and management or wholly upon labor. There is an obligation upon both to have regard for the public welfare and to work in good faith and willing cooperation to secure the largest and best results.

Moreover, this policy involves no sacrifice to either party. Labor has a larger interest in actual wages than in nominal wage rates, and wages are far more dependent upon fundamental conditions than upon the efforts of the unions. The rise of the standard of living always has been dependent upon the increasing efficiency of the industrial organization as a whole. Organized labor has the power to shut down industry, but it does not have the power to get more wages out of any business than the business can pay.

On the other hand, it is not in the power of the employing class to prevent a broad distribution of the benefits of industrial progress. The products of industry are made to be sold and distributed and, with production rapidly increasing, industry would choke down and come to a standstill if the purchasing power of the millions was not increasing at the same rate. Distribution, either by rising wages or falling prices, is inevitable, and when prices fall, as labor is eliminated from the cost, purchasing power is increased even more generally and equitably than by wage advances.

Cutting Through Five Feet of Cast Steel

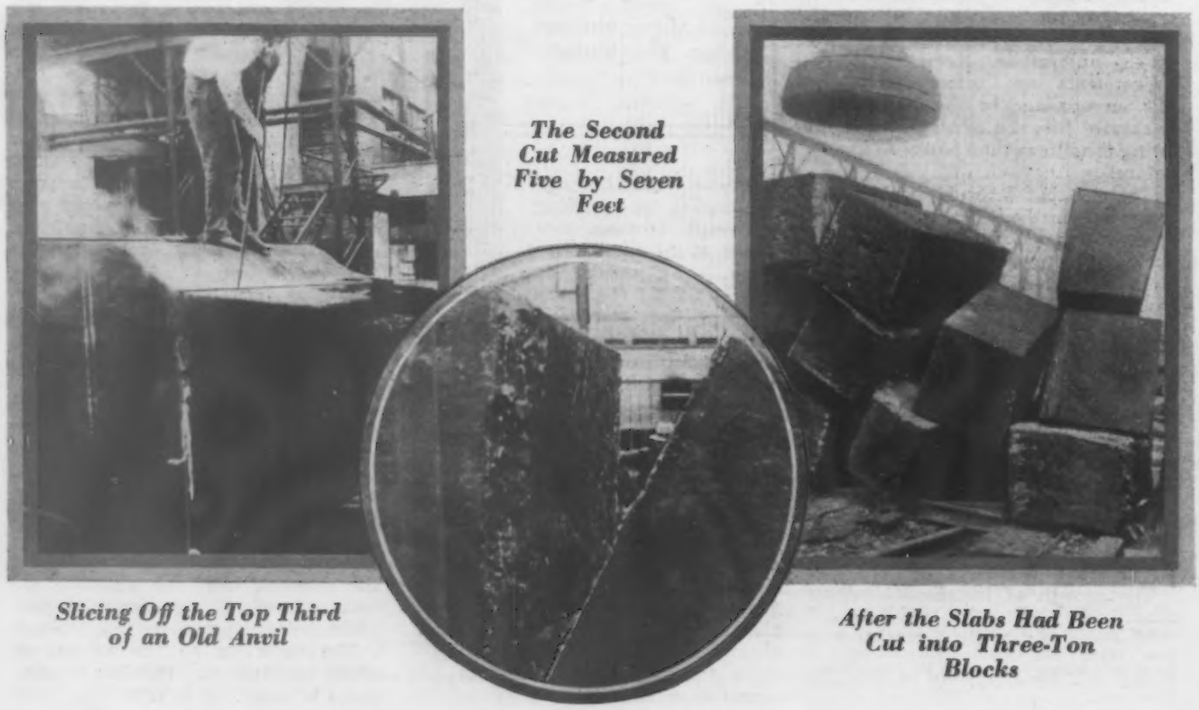
CUTTING and drilling of large masses of steel or cast iron by means of an "oxygen lance" has been mentioned in THE IRON AGE from time to time, but seldom has there been so good an opportunity to indicate the capability of the method as by the accompanying views, furnished by Linde Air Products Co.

The job consisted of scrapping a 55-ton steel casting—an anvil of a steam hammer which had become obsolete. Pieces as large as 18 x 28 x 60 in. would have been acceptable for charging into open-hearth furnaces, but some comparative figures showed that a less area of cutting would produce blocks approximately 20 x 20 x 48 in.

For this purpose the anvil was tipped over on its side and the photograph shows a workman slicing off the top third. A parallel cut halved the remaining block—this cut being 62 in. deep and 7 ft. long. (Perhaps a better idea of the size is had by the comparative size of the men.)

After trimming off the lugs and pads with a cutting blowpipe the rest of the cuts were made through 20-in. metal. It was found economical to use an oxy-acetylene blowpipe to open the kerf ahead of the lance for the lighter cutting. The oxygen lance alone was better on the 5-ft. cuts.

The limiting thickness of steel which can be cut by this method has not yet been reached, but the oxygen lance is probably the only way to cut steel masses of such unusual size, and the logical way to cut sows or slaggy spills of moderate thickness—say on the order of 20 in.



Slicing Off the Top Third of an Old Anvil

The Second Cut Measured Five by Seven Feet

After the Slabs Had Been Cut into Three-Ton Blocks

Control by Using Light Rays

Temperature or Illumination Subject to Accurate Adjustment by Automatic "Electric Eye"

AUTOMATIC determination of temperatures of hot steel, by means of the photo-electric cell or "electric eye," which has been developed by the Westinghouse Electric & Mfg. Co., East Pittsburgh, was demonstrated by J. V. Breisky, research engineer for the Westinghouse company, at a meeting of the Metropolitan section of the American Electric Railway Association, held in New York on March 7. Mr. Breisky pointed out that no previous mechanical device has been quick enough to give the instantaneous record of the temperature of metal in the blast furnace or rolling mill, and that tremendous losses have therefore occurred.

He demonstrated the precision of the photo-electric cell by means of a cozy glow heater and a meter calibrated in degrees temperature. A varying current was made to pass through the heater, the temperature of the heating element thus being made to rise and fall. The slightest change, hardly noticeable to the human eye, caused an instantaneous variation in the reading of the meter. In all processes of steel manufacture where accurate control of temperature is essential, and where human eyesight finds it difficult to judge, the "electric eye" readily indicates temperatures from 1300 deg. Fahr. up to the highest heat encountered.

Mr. Breisky pointed out that, in the United States alone, several hundred thousand tons of steel are scrapped annually, or sold as an inferior product, because of lack of accurate temperature control in steel mill practices. The tremendous increase in the use of alloy steels in recent years has made the avoidance of waste imperative, since losses due to inadequate temperature control are far more expensive with the high-priced metals.

Another application of the "electric eye" is the automatic control of lighting in factory, office or school. Variations in daylight are immediately corrected by artificial light, providing an unvarying degree of minimum light without human interference.

In the Westinghouse Plant at East Pittsburgh a Photo-Electric Cell Automatically Controls the Use of Artificial Illumination

New Fan for Cooling and Ventilating Large Areas

AN "Aeroplane Heat Killer" has been brought out by the Coppus Engineering Corporation, Worcester, Mass., to supplement its line of Vano Heat Killers. The Vano device is of velocity type, while the Aeroplane is of volume type designed to move a large volume of air at moderate velocity. Both types are intended for cooling, ventilating and drying service in steel mills, foundries, heat-treating and other plants. High operating efficiency and elimination of recirculation of air are features.

The Aeroplane heat killer is built in two sizes. The No. 1 delivers 10,500 c.f.m. at a velocity of 2600 ft. per min., while the No. 2 handles 15,600 c.f.m. at a velocity of 3850 ft. per min. Both machines are equipped with an inlet thimble, diffuser with baffle plate in its upper part, tripod, starting switch, and a motor. The diffuser and inlet thimble serve to guide both the incoming and the outgoing air currents, preventing recirculation, while the baffle plate in the upper part of the diffuser prevents rise of the air beyond the height desired. The No. 1 machine is equipped with a 1-hp. motor and the No. 2 with a 3-hp. motor, the speed of both motors being 1750 r.p.m. The weight of the smaller Aeroplane heat killer is 250 lb., and of the larger, 270 lb.

Recirculation of Air Is Eliminated and Means Are Provided for Keeping the Breeze at Proper Height

Wodack Hand Saw Acquired by DeWalt Corporation

THE Wodack electric hand saw and the Wodack electric combination mortiser and router have been acquired by the DeWalt Products Corporation, manufacturer of metal, wood and stone-cutting equipment, Lancaster, Pa.

Four models of the hand saw are made. The model K weighs only 15 lb. and has cutting capacity of 2⅝ in., while the models C and B have cutting capacity of 4⅛ in. The model B is equipped for beveling, as is also the model D, which has capacity for cutting material up to 4½ in. The model D, the largest machine, is powered with a 1-hp. General Electric motor, and is equipped for beveling. The Wodack hand saw was described in THE IRON AGE of March 22, 1928.

The International Railways Fuel Association will hold its twenty-second annual convention at the Hotel Sherman, Chicago, May 6 to 9.

Grinding Tungsten-Carbide Tools

Carelessness the Cause of Many Difficulties—Work Should Be Done by One Man, Adequately Instructed

CARELESS grinding is the cause of many of the difficulties experienced with tungsten-carbide cutting tools, according to Thomas Prosser & Son, 15 Gold Street, New York, distributers of Krupp Widia tungsten-carbide tools in the United States and Canada.

With proper grinding of primary importance in the success of these tools, it is better to assign the grinding to one carefully instructed operator rather than to permit each operator to grind his own tools. It is

Gage Designed to Facilitate Grinding Widia Tungsten-Carbide Tools for Machining Cast Iron. Gaging the clearance is shown above and gaging the tool angle, below

stated that Widia tools are best ground on the special abrasive wheels developed for tungsten-carbide, and under a large and constant flow of water so that the tools will not be suddenly heated or cooled. Only light pressure should be used, especially when the tools are ground dry, because a heavy pressure would cause overheating. The Widia tip must not be water quenched while it is hot because this is apt to crack the material and render it unfit for further use.

Other comments by the company are: "Rotation of the grinding wheel should be toward and not away from the cutting edge; this avoids chipping. In general Widia tools should be ground by hand rather than in a holder, but when it is necessary to use a grinding fixture, the feed per pass should not be greater than 0.0005 in. To secure the fine edge, free from nicks, necessary for the successful use of Widia tools, finishing should be done by hand on a smooth-running vibrationless machine having carefully trued wheels.

"The tendency of many operators is to grind a greater clearance beneath the cutting edge than recommended. The smaller the clearance angle the better the support of the Widia cutting edge and the longer the life of the tool. Finishing should be done on the side of the wheel or on the front of a cup wheel, as the periphery of the wheel will undercut, giving a greater clearance than apparent. Tools for cast iron should have a clearance angle of about 4 deg. In many cases the length of the time between grinds has been doubled by decreasing the clearance angle from 6 or 8 deg. down to 4 deg.

"It is very important in grinding Widia tools that the proper recommended tool angle be maintained. Ordinarily, the tool should be ground on the front or side rather than from the top. This maintains the thickness of the tip and the proper top rake angle."

To facilitate grinding of Widia tools used in cutting cast iron, a stainless steel gage is being furnished gratis by Thomas Prosser & Son. As shown in the illustration, this gage may be used for gaging both the clearance and the tool angles. For tools used in machining other materials a similar gage or template with angles suitable for the material to be cut, as per the subjoined recommendations, can be made. Observance of the tool angles listed is emphasized as assuring better performance and longer life of the Widia cutting tools.

Material to be Machined	Clearance Angle α ±1°	Tool Angle β	Our Lip Designation
Soft Steel	4°	60 - 65°	S
Hard Steel	4°	65 - 74°	HS
12% Manganese Steel	4°	80 - 84°	MN
Stainless Steel	4°	65 - 74°	HS
Chilled Cast Iron	3°	82 - 86°	CCI
Soft Steel Castings	4°	68 - 73°	HS
Hard Steel Castings	4°	73 - 78°	CI
Grey Cast Iron	4°	74 - 80°	CI
Bronze, Brass, etc.	6°	65 - 75°	BR
Aluminum Alloys	8°	50 - 55°	AL
Planer Tools	As above but with Negative Back Rake 12°-15°		P

Clearance and Tool Angles Recommended for Widia Tungsten-Carbide Cutting Tools

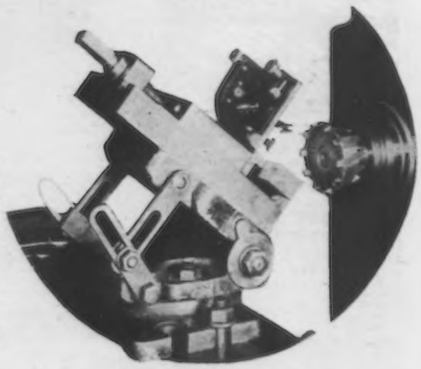
Optical Bevel Protractor for Precise Work

AN optical bevel protractor intended for use where the usual protractor would not be sufficiently accurate has been placed on the market by the Bausch & Lomb Optical Co., Rochester, N. Y. This device can be used wherever the usual protractor is employed.

The instrument has an accurately machined base on which the main body is hinged. The body can be swiveled by turning the thumbscrew at the front, while the level vial may be positioned accurately around the circular hole in the center of the instrument by revolving the thumbscrew on the head. This screw, through a worm and wormwheel, actuates a graduated dial within the instrument. The lever at the lower side holds the worm in mesh with the graduated dial; by lifting it the dial and vial can be shifted quickly for gross settings.

The dial itself is graduated to 1/6 of a degree, every degree line being designated by a number. The gradu-

OPTICAL Bevel Protractor Used to Determine the Angle Between a Horizontal and an Inclined Surface. Checking of dovetail surfaces and making set-ups on surface plates are among uses for this instrument



ations are observed through the eyepiece, which so magnifies the spaces between the graduations that a vernier can be read with ease to within one minute of arc.

The instrument is compact, measuring approximately 4 in. across. It has been found useful in checking dovetail surfaces of machine tool slides and also in making setups on surface plates where the sine bar has been considered indispensable.

Business Improvement Postponed to Autumn

BY LEWIS H. HANEY
Director, New York University Bureau of Business Reseach

FAVORABLE FACTORS

1.—Greater stability in commodity prices.
2.—A more than seasonal gain in the unfilled orders of the Steel Corporation
3.—A fair seasonal gain in the automobile business
4.—Money rates moderate and lower than the average yield on high-grade bonds
5.—Investments in securities by banks show some increase.
6.—Large prospective construction projects by municipalities, railroads and utilities

UNFAVORABLE FACTORS

1.—Continued declining trend in employment and payrolls
2.—Continued declining trend in building contracts and permits
3.—Retail trade declined in March
4.—Railroad car loadings and earnings show no improvement
5.—Foreign trade continues to recede
6.—Copper shipments lag and stocks accumulate, forcing price reduction
7.—Stock market speculation shows inflation, far outrunning business prospects and probably tending to restrict the flow of funds into investment channels
8.—Reaction in the bond market
9.—The P-V line continues below normal

THERE is no indication given by any important business barometer that the long awaited recovery in business is yet at hand, unless it be found in the stock market or in the unfilled orders of the United States Steel Corporation. The stock market, however, is so clearly a "hangover" from the 1929 speculative spree, stimulated by the inflation of artificially easy money in New York, that it should not be taken too seriously. The gain in unfilled orders was at least partly due to decreased shipments in March.

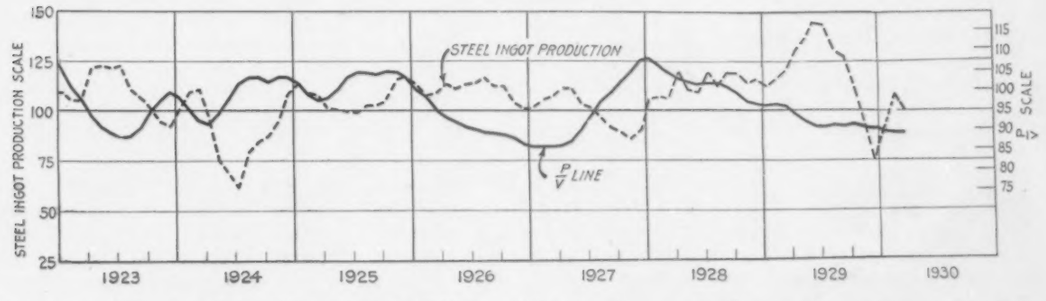
The recent halt in the decline of commodity prices probably deserves the most serious consideration, but it is not yet clear that it marks a final stabilization, particularly in view of recent declines of wheat, cotton, copper, and steel scrap, and several other basic commodities. The absence of strong purchasing power on the part of domestic labor and farmers and foreign buyers, to say nothing of the large stocks of many basic commodities, does not supply a good basis for a sustained rise in prices. The unfavorable factors are still in the ascendant and continued dull business throughout the summer is probable.

The P-V line while moving approximately sidewise is still below normal. No sustained recovery in business is likely until this barometer rises and regains its normal level. Nor, judging by the results thus far attained, can we talk business into a rising trend.

With payrolls down and retail and foreign trade backward, both commercial loans and money rates (at least in speculative centers) are quite low. Not until commodity prices are definitely stabilized and begin to rise, and the employment curve turns upward, however, will business men be able to take advantage of the abundance of funds. Speculators in stocks have seized upon easy money—the more eagerly in that nowadays it is the fashion to disregard earnings.

As we read the P-V line and interpret what it stands for, it calls for a further readjustment in business activity and liquidation of commodity inventories during a period sufficient to allow the development of a stronger demand and supply situation. This period is likely to be prolonged as a result of the too early administration of stimulants. In any case, it would be very unusual if business were to find itself in shape for a sustained period of expansion before autumn. This observation also applies to the steel industry.

(The next article by Dr. Haney will appear in the issue of May 8.)



Direction and Position Below Normal of the P-V Line (this based on ratio of commodity prices to the physical volume of trade), Suggests No Sustained Expansion in Business Before Autumn

This Issue in Brief

Success of apprentice-training course depends largely upon skill exercised in selecting applicants. The boy who will not study, who has no interest in further education, or who has no aptitude for the work must be rejected.—Page 1210.

* * *

Chromium-plated parts are first given a flash coating of nickel. The copper plating is applied next. If the copper undercoat were applied directly to the steel, it would be necessary to use a cyanide copper bath. But with the flash nickel coating an acid copper bath is used, which can be operated at a higher current density.—Page 1218.

* * *

Grinding wheel automatically adjusts itself to contour of parts being ground, as it is mounted on end of a balanced shaft, exerting a uniform pressure of 25 to 30 lb. —Page 1220.

* * *

Natural gas proves to be economical fuel in tube mill. Used not only in skelp furnace, but for heating galvanizing tank also.—Page 1227.

* * *

Foreman submits a report each quarter on each apprentice in his department. The report goes to the training supervisor, who keeps in touch with the boys in training in various production departments and in the municipal trade school.—Page 1212.

* * *

Better plating results from cleaning parts electrically in a chemical solution after forming. This has decided advantages over mechanical cleaning, auto parts manufacturer finds.—Page 1218.

Skilled heat treaters not required when electric heat is used, portable tool manufacturer believes. With the exception of the department head, unskilled labor is employed, at less than half the hourly rate that would have to be paid if fuel-fired furnaces were used.—Page 1215.

* * *

Interference with economic laws prolong depression, says George E. Roberts. The business situation will soon clear itself if the free play of economic forces is not hindered by arbitrary interference.—Page 1229.

* * *

Greater strength, ductility and hardness may be secured by quenching and tempering the ordinary carbon rail, if the metal is sound and homogeneous.—Page 1224.

* * *

Fuel saved by improved design of furnace for heating skelp. The furnace is regenerative, with somewhat narrower chambers than usual, and a deeper hearth. It acts quickly and exhaust gas temperature is low.—Page 1226.

* * *

If the steel is to be intricately heat treated, a knowledge of the methods used in making it is useful. One of the important factors is the deoxidizing procedure in finishing the melt. If the steel is such as to require the use of an abnormal amount of deoxidizer, the steel may fail in subsequent fabrication or service.—Page 1223.

* * *

Welded pipe is cut to commercial sizes in regular line of production in tube mill. This makes rehandling unnecessary again before the threading operation. Standard tolerances are met without difficulty.—Page 1227.

Unemployment due to mechanization is not lasting, says economist. For every reduction of costs and prices releases an exactly corresponding amount of purchasing power for other uses, and it is used promptly in some way.—Page 1229.

* * *

Insufficient capacity for making copper wire rods exists in the United States. Indicated future demands of the electrical industry reveal that present capacity will soon be inadequate, even running two shifts.—Page 1221.

* * *

Labor must do its share to maintain industrial equilibrium. Demands for wages which cannot be paid, or for conditions which uneconomically increase the cost of production, will lessen the purchasing power of the entire population.—Page 1230.

* * *

Discontent which the average employee feels when he reaches the inevitable dead level (when he realizes that no further promotion or higher earning capacity is in sight), can be counterbalanced by a growing interest fund. Therefore, workers should be encouraged to save in the early part of their working years.—Page 1228.

* * *

Heat-treating costs cut and quality of work improved. Operations are rigidly standardized. Furnaces are automatically held to heat and parts are quenched on scheduled time.—Page 1214.

* * *

Stop coddling workmen, if you want an efficient organization. Stop treating them like hired men. Respect their rights and their opinions, let them be heard, and give them facts about your business.—Page 1228.

Give Corporation Clean Bill of Health

Statements of Management Policies Feature Annual Meeting of Steel Industry's Largest Company

STOCKHOLDERS of the United States Steel Corporation were given some highly reassuring information at the annual meeting held at Hoboken, N. J., April 21. Myron C. Taylor, chairman of the finance committee, told why he considered the basis of business was now sound and explained the methods of investigation that has become corporation policy in respect to both plants and personnel, all calculated to strengthen the position of the company. President James A. Farrell said he expected the corporation would have a good average year and emphasized that the economies that were being achieved came not out of labor and wages but out of mechanization. Incidentally he indicated that Pittsburgh's place in steel was being enhanced by the increasing use of water transportation.

David F. Houston, president of the Mutual Life Insurance Co. and Secretary of Agriculture from 1913 to 1920 and Secretary of the Treasury from February, 1920, to March, 1921, was elected a director to succeed the late Robert Winsor.

Three Year Budgeting Every Year

Mr. Taylor told how early in his association with Mr. Farrell in the company, an analysis of each of the company's properties was undertaken, to determine whether its equipment was suitable for the purposes for which it was intended to be used, and whether the plant as a plant was similarly suitable. "We also undertook," he continued, "a second analysis, to determine whether the location of each of our plants was suitable to the availability of raw materials and nearness of consuming markets concerned.

"Those two analyses resulted in a policy with respect to the future activities of the company in particular localities, and in building up and improving those that were considered to be permanent.

"This resulted in a budget which has been constituted for the benefit of the operating officials, prepared by the executives, that covers a period of three years, showing the company's needs for each of those years. And at the beginning of each year, in January, a new complete three-year budget is prepared and is ready for review by the finance committee as prepared by the president and his staff.

"Similar studies have been made in regard to operating systems in the corporation, as well as personnel.

$200,000,000 Appropriations for 1930

"We feel," continued Mr. Taylor, "that we are able to say to you today that, with the very large appropriations which the finance committee has authorized, aggregating as much as $200,000,000 for this year, your interests, so far as efficiency of plant and of organization is concerned, are absolutely insured, and that this plan, if followed on into the future, as it will be, will insure the permanency of those successful operations."

What Mr. Taylor had to say regarding business conditions was in part as follows:

Readjustment Has Been Accomplished

"We witnessed last year very great readjustment in security markets, which to an extent was bound to occur, but which, gaining impetus by panicky conditions in the public mind, ran beyond its proper point in readjustment. In a time like that it is important that an industry such as ours should assert itself with confidence and endeavor to the best of its ability to hold the public from extreme action.

"That readjustment fortunately was largely confined to one of security values; whereas in 1922 the occasion for the tremendous readjustment which occurred was a violent shrinkage in commodity values. Since last fall certain commodity values have now witnessed a readjustment, particularly those that are designated as crop commodities.

"And so today, it seems that those most needed—or we might say inevitable—readjustments which may have faced us last summer have taken place, and we feel, because of it, that the foundation on which we stand today is basically sound and that we face the future from that foundation with a feeling of assurance and confidence and safety. There appear to be no great inventories in the community which await readjustment to lower levels.

"This is a very strengthening and wholesome position. We could hardly hope to continue on an even level the great activities of last year. There must be, in keeping with economic rules which man cannot long defy, a readjustment following every unsound activity. That readjustment, we feel, has in a general way, been accomplished."

Forecast ¼ Per Cent Wrong

Mr. Farrell was introduced to the meeting by Mr. Taylor as having been with the same company in various positions for 48 years and therefore eminently qualified to discuss the affairs of the corporation. Mr. Farrell's remarks were in part as follows:

"You will recall that last year one of our stockholders asked me how much business the Steel Corporation would do in 1929. Well, in an unguarded moment I stated that we would do a business of $1,500,000,000, and I am here to apologize for the fact that we fell short by $4,000,000.

"But I do not propose to indulge in any prognostications this year as to how much business we are going to do in 1930, because we are going to try to do as well as we can, without fixing any particular figure.

Water Shipments Increasing Pittsburgh's Output

"Time was when we shipped everything by railroad; today a substantial part of our business is being done through the utilization of waterways. That is particularly true in the Birmingham district and the Pittsburgh district, which was more or less looked upon some years ago as one of constantly decreasing capacity, but whose output has actually increased by reason of the great movement of materials down the Ohio and Mississippi rivers.

"Our operations for the last quarter were about 82 per cent of capacity. Of course, our capacity is greatly in excess of that of a few years ago. Eighty-two per cent today is the equivalent of probably 100 per cent three years ago.

Securing Economies by Improvements

"We had in 1929 the largest year in the history of the United States Steel Corporation with the exception of one year, I think 1916. Our costs of production have been lowered in an orderly way and we think that, with the improvements we are making and the increased efficiency arising from electrification—and another term that has come into vogue, mechanization—the Steel Corporation will be able to hold its own in this country and in every other market. It is not the custom now to get one's economies out of labor and wages, but rather out of machinery and electrical effort.

Expects a Good Average Year

"In the first quarter of this year, as I have said, we have operated 82 per cent of our capacity. We are running along about the same at the present time, with a little better backlog than we had this time last year—we have about 4,500,000 tons on the books. We are hoping that this will continue in about the same ratio for the second quarter. Of course, it is rather difficult to predict for the whole of the year, but we are looking forward to a good average year in our business.

"Supplementing Mr. Taylor's remarks, I am pleased to say that wherever we go among our men in our mills, among the 240,000 employed in this corporation, whether in the mills or in the mines, we find them just as enthusiastic with respect to what we desire to accomplish in our company as we are ourselves."

Chain Belt Co., Milwaukee, has moved its New York office from 50 Church Street to the new Chrysler Building.

Motor Industry Coming Back

General Manager of National Automobile Chamber Says Business Is on Upgrade

THAT sales of automobiles are getting better and that production is increasing and inventories of used and old model cars are being rapidly reduced were statements by Alfred Reeves, general manager of the National Automobile Chamber of Commerce, in a talk to the National Metal Trades Association in New York last week in a discussion of the automobile situation.

"The automobile industry is paying the price for too much anticipated prosperity," he said, "but it is gradually putting its house in order. Sales of used cars and old model cars have been made at an enormous rate in the past few months. The Chevrolet Motor Co. made a record of $1,000,000 sales of used cars daily for 20 days."

With these surplus stocks out of the way, automobile buying in the immediate future will be more quickly reflected in larger manufacturing schedules and in increased orders for raw materials, he said.

Including the used cars, the automobile sales thus far this year are not far from those of the corresponding period last year, but many of these sales are not getting into this year's production.

Characterizing the used car as the skeleton in the automobile industry's closet, Mr. Reeves said that if automobile salesmen were as capable in selling new cars as the average car owner is in selling his old car in the trade-in, the automobile industry would be faring much better.

Referring to the scrapping of old automobiles, Mr. Reeves said that 2,800,000 were put out of the way last year, and it is hoped that the national highway safety campaign inaugurated this year will increase the number junked this year by at least 500,000. Various plans are being worked out experimentally to get rid of the old cars, one of which he mentioned is the offer of the Ford Motor Co. to pay $20 for any old car that is driven up to its plant. The Ford company is conducting an experiment in scrapping to see what can be done all over the country to get the old hulks off the roadsides and to utilize the old material.

"Gasoline consumption, an excellent gage of automobile use," Mr. Reeves said, "ran 35 per cent more during the first quarter this year than during the same period of 1929, which means that highway transportation with all its offshoots is greater than ever."

Zinc Institute to Promote Research

A resolution asking that its executive committee prepare at the earliest possible date a report suggesting lines of research which should be undertaken by the American Zinc Institute and authorizing the employment of necessary technical assistance was adopted by the board of directors of the institute at its twelfth annual meeting at Hotel Statler, St. Louis, April 15, 16 and 17. The members of the institute hope to build up the industry through efficient research that will develop new markets for their product.

"The Value of Research in Non-Ferrous Metals," was discussed by Dr. H. W. Gillett, director, Battelle Memorial Institute, Columbus, Ohio, who told of the large sums expended in research work in other lines. Defining research as the business industry's insurance for tomorrow, he attributed the growth and prosperity of aluminum, nickel, copper and brass to the results of well-directed research methods efficiently practiced.

Galvanizing Industry Falling Behind

George Charls, president of the National Association of Flat Rolled Steel Manufacturers, in a paper on "Zinc in Galvanizing," told what galvanizers have been doing in increasing the uses of galvanized iron and steel. He said that farmers should have galvanized roofing. While the demand is increasing, it is not keeping pace with the population of the country, he said, and, therefore, the galvanizing business might be considered as going backward. He urged that the zinc industry work with the sheet steel industry for mutual benefit. "There will be no new uses for zinc until research work finds them, and many lines of research are essential if the best results are expected," he said.

William A. Willis, general manager, Copper & Brass Research Association, New York, presented a paper on "Zinc in Brass," in which, he, too, discussed the value of research work.

Conditions in the Tri-State District, the most important of the zinc-producing districts, were described in the report of M. D. Harbaugh, secretary of the Tri-State Zinc and Lead Ore Producers' Association, Joplin.

New Officers

Board of directors was elected as follows: C. F. Dike, Stanley Eaton, Julius W. Hegeler, John A. McCarthy, William A. Ogg, Jesse A. Starr, Henry Wardner, Howard I. Young and J. A. Elton. Officers were re-elected as follows: President, R. M. Roosevelt, Eagle-Picher Lead Co., New York; vice-presidents, A. P. Cobb, J. A. Elton and John A. Robinson; treasurer, Howard I. Young and secretary, Julian D. Conover.

Foundry Instructors to Hold Dinner Meeting

The men who teach foundry subjects at engineering schools will get together on Wednesday evening, May 14, for their annual foundry instructors' dinner, held in connection with the American Foundrymen's Association convention at Cleveland.

This event has become a regular and well-attended feature of the foundry convention. It was organized for the purpose of bringing together the engineering shop instructors of the various engineering schools at a time when they might also take advantage of the convention sessions and exhibition of foundry machines and equipment.

This year the dinner meeting will be addressed by a well-known foundryman on the subject, "The Place of the Engineering Graduate in the Foundry Industry of Today." A. E. Wells, director of engineering shop laboratories, Cornell University, Ithaca, N. Y., will preside.

Metal Lath Rules Are Officially Approved

WASHINGTON, April 18.—The Federal Trade Commission has acted on rules of business practice that were adopted by the metal lath industry at its trade practice conference held June 27, 1929.

Eight rules were approved by the commission. They relate to the following subjects: Willful interference with contracts, misrepresentation of products, misrepresentation of a competing dealer's prices, defamation of a competitor, threats of suit for patent or trade mark infringement, secret payment of rebates, selling goods below cost and discrimination in price.

Mechanical Equipment Sales and Shipments

	March, 1930	February, 1930	March, 1929
Mechanical stokers sold(a)	85	73	117
do., three months	211	.....	294
do., hp.	27,951	22,648	42,432
do., hp., three months	63,797	.....	116,378
Electric industrial trucks and tractors shipped(a)	123(b)	113	201(b)
do., three months	376	.....	497

(a) United States Department of Commerce.
(b) Including 10 for export, in each case.

Elastic Work Day Reduces Labor Turnover

Delaware & Hudson President Stresses Advantages of Plan Which Also Minimizes Unemployment

HOW the elastic work day has reduced unemployment and stabilized labor turnover on the Delaware & Hudson Railroad was told to the members of the National Metal Trade Association last week by L. F. Loree, president of that road. The elastic work day was inaugurated by the railroad in 1922, following the railroad shop strike. It applies to shop crafts and track forces, and provides that the men be given employment from 8 hr. to 10 hr. a day, with a six-day week, and that no new men are to be hired until every man in the employ of the company has at least 60 hr. of work a week.

During the present recession in business not one man has lost his job. The problem of curtailed work was solved by the men themselves, who voluntarily went on a five-day week basis and 8 hr. day, thus dividing the work up among all of the employees.

Unemployment Insurance

The Delaware & Hudson has also successfully introduced a modified form of unemployment insurance. Every man who is discharged from its employ is given a weekly wage of $15 for six weeks. This insurance has never cost the company more than $8,000 a year. Discharged employees have almost without exception found other jobs within the six-week period.

"The operation of our elastic work-day plan has had a marked effect upon the continuity of employment," declared Mr. Loree. "The maximum number of employees in our maintenance branches in 1920 was 10,050 and the minimum 8136, a variation of 1914. By 1929 the maximum dropped to 6118 and the minimum to 5700, a variation of 418, the labor turnover being reduced by 78.2 per cent.

"The success in dealing with seasonal fluctuations in the maintenance-of-way department was the largest contributor to this variation, the actual variation being 1450 in 1920 and 172 in 1929, or a reduction in the labor turnover of 86.2 per cent. The adoption of economies required a smaller number of men to handle the operations, while concentration in fewer shops required the absorption of about 400 men.

"Investment in new machine tools has been about $100,000 a year, and the number of places made vacant thereby is about equal to the normal wastage of the force. Where an employee resigned, the position has usually not been filled.

"Both the men and the company benefit by the continuous employment of a group of men educated to its methods and trained to work together, instead of continuously introducing new men ignorant of our practices. As an illustration, on April 1, 1922, we had 2171 employees, with from six months to two years' service. By Jan. 1, 1930, the number of these men of short experience was reduced to 525, or by 76 per cent. A total of 75.6 per cent of our employees have completed five or more years of service. Looking at the matter from another viewpoint, we have on the payrolls 5591 men over 40 years of age, 2800 men over 50 years of age and 1207 men over 60 years of age. The question of the age limit in industry is very greatly overstressed."

Fourth Largest First Quarter

Automobile Production in Three Months Was Exceeded Only in 1929, 1926 and 1924

WASHINGTON, April 21.—Reflecting a gain of 77,360 units, the output of motor vehicles in the United States in March totaled 401,378, against 324,018 in February, according to reports received by the Department of Commerce. The March production was the highest since last September, when the total was 415,912.

Production of passenger cars in March was 335,789, against 275,811 in February, a gain of 59,978. This was the highest since the 364,786 of last September. Truck production in March was 64,200, the highest since last July's total of 73,649 and exceeding by 17,035 the February total of 47,185. Taxicabs to the number of 1389 were produced in March, compared with 1022 in February.

Nearly a Million Cars in Quarter

In the first quarter 998,566 motor vehicles were produced in the United States, against 1,452,910 for the like period of last year. The 1930 quarter production consisted of 846,127 passenger cars, 149,456 trucks and 2983 taxicabs. Last year the quarter's output was 1,266,434 passenger cars, 180,225 trucks and 6251 taxicabs.

Only two years prior to 1929 had larger first-quarter output than did 1930. In 1926 a total of 1,018,332 vehicles, and in 1924 a total of 1,071,563 vehicles, made up the three-month production.

Canadian production in March totaled 20,730 motor vehicles, the highest since last June, with a total of 21,492, and a gain of 5182 over the February output of 15,548. Passenger cars produced in Canada in March totaled 17,165, against 13,021 in February; truck production totaled 3565 and 2527, respectively. For the first three months of 1930 motor vehicles to the number of 46,666 were produced in Canada, against 93,409 for the same portion of last year.

Bethlehem Stock Taken by 43,357 Employees

The Bethlehem Steel Corporation has announced that 43,357 employees subscribed for shares of the corporation's 7 per cent cumulative preferred stock under this year's employees' saving and stock ownership plan. This is the seventh year in which employees have had an opportunity to buy shares on easy terms of payment. The price, $125 a share, was the highest of any year's offering but the number of employee subscribers was greater this year than ever before.

Each share actually costs the employee $113.56 instead of $125, for while he is paying for the stock at $4 a month over a period of 29 months, he receives nine quarterly dividends during that time and special benefits of $1 for the first year and $2 for the second, which reduce the cost accordingly. Then, if he holds his stock for three more years, he receives $12 in additional special benefits of $3, $4 and $5 respectively for each year.

Steel Furniture and Shelving—Orders and Shipments

	March, 1930	February, 1930	March, 1929
Steel furniture: (a)			
New orders	$2,637,083	$2,370,426	$2,931,365
do., three months	7,893,544 (b)	.....	9,985,301
Shipments	2,701,248	2,549,650	2,974,910
do., three months	8,141,714 (b)	.....	9,923,494
Unfilled orders, end of month	1,618,485 (c)	1,682,719	2,353,896
Shelving: (a)			
New orders	834,249	758,690	1,145,632
do., three months	2,317,885 (d)	.....	3,164,764
Shipments	811,942	682,752	1,109,876
do., three months	2,169,399 (b)	.....	2,986,151
Unfilled orders	807,733	781,876	801,643

(a) United States Department of Commerce.
(b) Smallest for first quarter, since 1925.
(c) Smallest since December, 1927.
(d) Smallest for first quarter, since 1927.

"Unemployment an Economic Flaw"

Sam A. Lewisohn, of Miami Copper Co., Puts It Up to Business to Provide Remedies

DESCRIBING unemployment, seasonal or otherwise, as the greatest flaw in our economic and social structure, Sam A. Lewisohn, vice-president of the Miami Copper Co., New York, in a paper prepared for the convention of the National Metal Trades Association last week presented a number of suggestions for the alleviation, if not the cure, of the conditions which are permitted to recur in American industry notwithstanding the fact that "we have in this country one of the best - hearted, good - natured, well - meaning groups of employers in the world."

Having been called abroad on the day he was to address the convention, Mr. Lewisohn was unable to appear in person, but his discussion was read to an interested audience.

"Even in the midst of prosperity," he said, "we have a great unemployment problem. A certain amount of this year-in and year-out unemployment is inevitable; in a growing civilization there must be a certain amount of flux," but the question he raised was: "Is all of it inevitable, or is a large proportion due to the failure of men like ourselves to run our business in such a way as to keep chronic unemployment at a minimum?"

Suggests Practical Remedies for Situation

He gave the following examples of what is being done and what can be done to meet the problem of seasonal unemployment:

"First, by concentrating on the distributive side of the business. For example, we can endeavor to stretch out the season of buying over as many months of the year as is possible through advertising, through the various ingenuities of salesmanship, and, if necessary, by making prices more attractive at certain off-season periods.

"Second, there is the device of introducing supplementary lines. This may take the form of launching wholly new lines, or, on the other hand, of studying the product intensively and adapting it so as to meet other than seasonal needs.

"Third, there is the method of manufacturing for stock during the slack season. This may be made possible by providing the necessary storage facilities and financing, or it may involve the necessity of introducing a staple line that is safe to manufacture in off seasons."

Mr. Lewisohn suggested a number of things which should be done by associations or groups of manufacturers as a preliminary to determining what specific steps can be taken to ameliorate the seasonal unemployment situation. Among these were:

The gathering of statistical data which will show trends in various industries as they affect various branches of the metal trades.

The holding of conferences and the conduct of studies which deal with the practices in regularization developed by various members.

Actual service activities in which individual concerns may be guided in the development of methods of regularization.

Active participation in trade conferences and national efforts to promote industrial stabilization in general.

Shop Operation Courses in Founding at Convention

Three courses in shop operation in gray iron, steel and non-ferrous founding are to be a feature of the American Foundrymen's Association convention in Cleveland, May 12 to 18. They aim to give instruction in shop fundamentals for the practical shop man.

The first one is on gray iron on Monday at 4 p. m. On the three following days at 4 p. m. there will be simultaneous sessions on the three subjects. Leaders and topics at these sessions are as follows:

Gray Iron—"Cupola Materials": Leader, C. J. Scullin, Alda Research Laboratories, Inc., St. Louis; assistant leader, E. J. Lowry, Detroit.

Steel—"Chipping, Grinding and Riser Removal": Leader, E. R. Robinson, Industrial Brownhoist Corporation, Bay City, Mich. Gray Iron—"Cupola Materials and Operation": Leader, R. S. MacPherran, Allis-Chalmers Mfg. Co., Milwaukee; assistant leader, F. J. Walls, Wilson Foundry & Machine Co., Pontiac, Mich. Non-ferrous—"Fuel-Fired Furnace Melting": Leader, E. E. Darby, Federal Mogul Corporation, Detroit.

Steel—"Core Room Practice": Leader, J. M. Sampson, General Electric Co., Schenectady, N. Y.; assistant leaders, H. E. Mooney, Falk Corporation, Milwaukee, and W. F. Wilson, American Steel Foundries, East Chicago, Ind. Gray Iron—"Gating and Risering": Leader, H. W. Dietert, United States Radiator Corporation, Detroit; assistant leaders, E. M. Handley, Chain Belt Co., Milwaukee, and Dr. Fritz Meyer, National Radiator Co., Johnstown, Pa. Non-ferrous—"Induction-Type Electric Furnace Melting": Leader, R. W. Parsons, Ohio Brass Co., Mansfield, Ohio.

Steel—"Practical Aspects of Heat Treating": Leader, A. W. Lorenz, Bucyrus-Erie Co., South Milwaukee, Wis.; assistant leaders, "On Manganese Steel," H. P. Evans, Hubbard Steel Foundry Co., East Chicago, Ind.; "On Alloy Steel Castings," D. Zuege, Sivyer Steel Casting Co., Milwaukee; "On Fuel Oil Characteristics," A. C. Jones, Lebanon Steel Foundry, Lebanon, Pa. Gray Iron—"High-Test Irons, Alloy Additions and Heat Treatment": Leader, H. Bornstein, Deere & Co., Moline, Ill.; assistant leader, F. B. Coyle, International Nickel Co., New York. Non-ferrous—"Indirect-Arc-Type Electric Furnace Operation": Leader, D. E. Broggi, Neptune Meter Co., Long Island City, N. Y.

In addition to the shop-operation course sessions on gray iron, C. J. Scullin will hold discussion groups each evening on the fundamentals of cupola operation. These will convene at 8 p. m. in the Hotel Statler on Monday, Tuesday, Wednesday and Thursday evenings.

Construction Work Done in First Quarter

Announcement by Robert P. Lamont, Secretary of Commerce, of the total of construction contracts in the first quarter of 1930 brought out two items in particular: New public works and utilities construction made a high record; residential building (as is well known) is in a heavy slump. Public and utility work reached $303,239,000, a full 60 per cent ahead of 1929 and 46 per cent above the average of the five years, 1925-1929, inclusive. It was 25 per cent over the 1928 total which was the best of the preceding five years.

On the other hand residential building of all kinds, including hotels and apartment houses, was scarcely more than half that of 1929, and much under half that of any of the four years, 1925 to 1928, inclusive. At $242,887,000, it was only 42 per cent of the volume in the average year, 1925-1929.

Railroad construction, among the items cited, showed a gain of 128 per cent over 1928. Lighting systems gained 249 per cent and water supply systems, 70 per cent. Public buildings, 33 per cent ahead of 1929, made a much better showing than in any of the earlier years.

Contracts Awarded in First Quarter
(Millions of Dollars)

	Average, 1925-1929	1929	1930
Public buildings	17.2	24.3	32.3
Hospitals and institutions	25.1	22.6	39.4
Educational buildings	74.2	77.8	75.6
Commercial buildings	224.6	244.2	207.0
Industrial buildings	144.1	175.0	146.1
Religious and memorial	26.3	17.4	25.2
Social and recreational	52.1	34.3	28.5
Public works and utilities	207.2	195.6	303.2
Residential buildings	577.7	467.7	242.9
Total	1,348.5	1,258.9	1,100.2

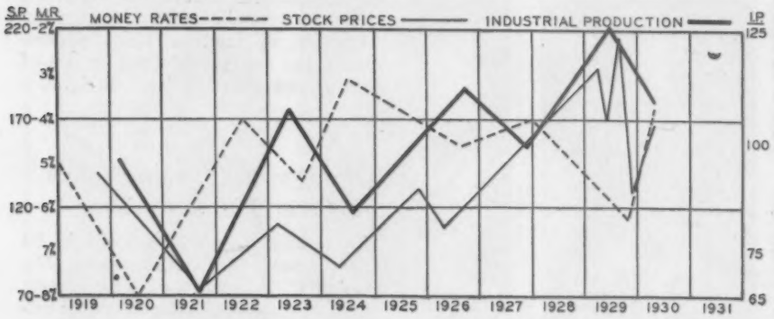
Union Twist Drill Co., Athol, Mass., has appointed the Smith, Booth, Usher Co., Los Angeles, as distributer for its line of twist drills, cutters, hobs, reamers, etc. The Union Twist Drill Co.'s arrangement provides also that the Los Angeles company will act as distributer for the S. W. Card Mfg. Co., a subsidiary of the Union Twist Drill Co., which makes taps, dies, screw plates, etc.

"Low Point Not Reached," A. T. Simonds

Cycles of Industrial Production Hit Their Lows at Seasonal Low Points—No Exception Since War

"THERE is little or no evidence that the low point for 1930 in industrial production has been reached," says Alvan T. Simonds, president, Simonds Saw & Steel Co., Fitchburg, Mass., in the May issue of *Looking Ahead*.

"Cycles of industrial production usually make their low points at one of the seasonal low points, i.e., midsummer or November-December. There is no exception since the war and it is not likely that 1930 will prove to be one. This cyclical low, because of President Hoover's efforts and for other reasons for which we do not have space here, may go but little below the low point already reached at the beginning of the year.



Money Rates Shown Are Commercial Paper Rates, New York. Stock prices are from the *Annalist*. Industrial production is from the Federal Reserve *Bulletin*. Only major movements are charted, made by connecting extreme high and low points by straight lines.

"Previous issues of *Looking Ahead* have pointed out that major movements in industrial production are *preceded* by corresponding movements in money rates *reversed*. The chart shows that major movements in stock prices are similarly preceded by major movements in money rates reversed. The money rates shown are commercial paper rates, New York, but in studying major movements only, Federal Reserve rediscount rates, acceptance rates or time money rates will answer equally as well.

"From the low cyclical points in every case except in 1921 stock prices turned up before industrial production. From the cyclical peaks in every case except 1929 stock prices turned down before industrial production. It is interesting to note that in the spring of 1929 there was a sharp falling off in stock prices. This preceded the cyclical downturn in industrial production in June. Similarly in 1921, a few months before the cyclical upturn in industrial production, there was a decided rally in stock prices. Here were two notices that, in response to economic influences only, the cyclical turning points had arrived. Psychological influences delayed the actual turning points till later.

"After the stock crash in October, 1929, stock prices fell abruptly and to a very low point. From this point they turned upward after money rates had begun to fall off. Industrial production turned up a little later, but this is doubtless only a minor movement, a seasonal movement.

"A study of the chart shows that the increase in stock prices that has occurred since November, 1929, is the usual occurrence at this period of the cycle and, as we have stated, ordinarily it precedes the major upturn in industrial production. In 1921 stock prices and industrial production turned up at the same time. In 1924 stock prices began to increase three months before industrial production. In 1926, stock prices began increasing in the spring. Industrial production turned up in the fall of 1927. Here was an unusually long lag. It illustrates the fact that stock prices were less influenced than was industrial production by the increase in money rates from 3 per cent in the summer of 1924 to 4½ per cent in the fall of 1926. In view of the facts we have just stated, it will not be surprising for stock prices in 1930 to keep on increasing (but not without minor reactions) for six to 12 months before industrial production makes its cyclical turn up."

To Advise Westinghouse on Research

Establishment of a scientific advisory board for the research laboratories of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., will bring before the company's specialists the latest theories in various scientific fields. Members of the board are: Dr. P. W. Bridgman, head of the physics department, Harvard University; Dr. G. B. Waterhouse, head of the department of metallurgy, Massachusetts Institute of Technology; Dr. C. E. Mendenhall, head of the University of Wisconsin department of physics; Dr. Stephen Timoshenko, head of the school of advanced mechanics, University of Michigan; and Dr. Edward Mack, Jr., professor of physical chemistry, Ohio State University.

The board will meet three times a year and its individual members will follow all research work conducted by the Westinghouse Company and act in an advisory capacity on matters of pure science. At the first meeting held on April 16, S. M. Kintner, manager of the laboratories, stated that the company expects the board members to stimulate its research specialists by their suggestions, and to bring recent theories into the work.

Seadromes—A New Outlet for Steel

The great possibilities of structural steel were stressed in a radio address on April 22 by Charles N. Fitts, president of the American Institute of Steel Construction, which was the feature of a salute to the steel construction industry sponsored by the Westinghouse Electric & Mfg. Co., East Pittsburgh, as a part of its weekly series of radio programs dedicated to the various industries.

Among the more unusual applications of structural steel mentioned by Mr. Fitts was the construction of the first seadrome, now being fabricated in Philadelphia, which will be anchored between New York and Bermuda next year and will afford an ocean airplane landing. The seadrome will be 8 acres in area and will be equipped with fuel and repair shops and a hotel. "A string of these artificial islands," said the speaker, "will later be floated in the ship route to Europe and will make possible a week-end abroad with complete comfort and safety."

New Orleans Business Directory

A "Red Book" of New Orleans commerce for 1930, published by the New Orleans Association of Commerce, is a classified directory of business in that city. The listings are both alphabetical and by products. In addition, the book contains brief articles on New Orleans and its trade.

Roller Conveyor Equipment in Foundry

It should have been mentioned in an article in our April 10 issue, regarding the General Electric iron foundry in Pittsfield, that all of the roller conveyor units going into the lineup of the mold-handling layout were furnished by the Mathews Conveyor Co., Ellwood City, Pa.

World Trade in Steel Sheets in 1929

Great Britain Provided Nearly Half the Exports, While Making Only One-Eighth of the Product

WASHINGTON, April 18. — Producing approximately 12 per cent of the world's output of black and galvanized sheets, Great Britain in 1929 supplied 993,862 tons of the 2,002,062 tons exported. Meanwhile the United States, with about 62 per cent of the world output, exported 340,967 tons, and Germany, with some 9.5 per cent of the production, shipped 267,233 tons to foreign markets. These figures come from an analysis on world trade in black and galvanized sheets in 1929, made by J. Joseph W. Palmer, Iron and Steel Division, Department of Commerce.

World Export Trade in Black and Galvanized Sheets in 1929

(In Gross Tons)

Country of Destination	United States	United Kingdom	Germany	Total (a)
Europe	32,318	39,852	161,914	234,084
Belgium	192	649	7,960	8,801
Denmark	694	7,586	6,847	15,127
Finland	895	8,636	2,044	11,575
France	15,828	1,116	9,964	26,908
Italy	4,488	125	10,051	14,664
Netherlands	1,177	1,320	40,858	43,355
Norway	1,394	8,261	2,748	12,403
Soviet Russia	428	(c)	39,284	39,712
Switzerland	7	76	16,014	16,097
United Kingdom	5,942	....	8,765	14,707
Other Europe (b)	1,273	12,083	17,379	30,735
North and Central America and West Indies	159,159	36,422	18,423	214,004
Canada	128,050	29,589	(c)	157,639
United States	....	668	18,397	19,065
Mexico	15,052	(c)	26	15,078
Cuba	7,367	(c)	(c)	7,367
British West Indies	316	6,165	(c)	6,481
Other countries (b)	8,374	(c)	(c)	8,374
South America	50,272	171,613	15,901	237,786
Argentina	14,160	116,438	12,584	143,182
Brazil	13,945	10,144	2,695	26,784
Chile	5,765	18,261	(c)	24,026
Other South America (b)	16,402	26,770	622	43,794
Far East	97,505	505,363	52,917	655,785
India and Ceylon	3,209	272,787	3,249	279,245
British Malaya	3,011	15,725	(c)	18,736
Dutch East Indies	17,042	597	18,055	35,694
Japan	30,082	66,945	29,520	126,547
Philippine Islands	28,507	(c)	1,778	30,285
Australia	8,104	98,915	(c)	107,019
New Zealand	62	35,263	(c)	35,325
Other Far East (b)	7,488	15,131	315	22,934
Africa	1,713	139,224	1,911	142,848
British East Africa	305	15,346	(c)	15,651
Union of South Africa	422	66,426	933	67,781
British West Africa	151	25,199	(c)	25,350
Egypt and Palestine	96	7,877	946	8,919
Mozambique	90	24,376	(c)	24,466
Other Africa (b)	649	(c)	32	681
Other foreign countries	....	101,388	16,167	117,555
Unallocated	....	....	....	400,000(a)
Total	340,967	993,862	267,233	2,002,062

(a) Includes 400,000 tons estimated total for other producers; not distributed.
(b) Except for United States, the suppliers may have some tonnage included in "Other foreign countries."
(c) Not specifically stated—included in "Other foreign countries."

Micromotion Study Applied to Manufacture of Parts

Description of several applications of micromotion study, by R. M. Blakelock, wage rate department of the General Electric Co., Schenectady, featured a well-attended meeting of the Metropolitan section of the American Society of Mechanical Engineers, held at the Fraternity Clubs Building, New York, on Thursday evening, April 17.

Masawo Kamo, engineer and educator, Tokio, Japan, who was elected honorary member of the A.S.M.E. in 1929 and was chairman of the organizing committee of the recent World Engineering Congress, was a guest of honor at the meeting. Dr. Josef Z. Schneider, Technical University, Prague, Czechoslovakia, and Wallace Clark, industrial engineer, New York, who recently returned from a year of consulting work in France, Switzerland, Poland and Roumania, were also guests. Dr. Lillian Gilbreth, president Gilbreth, Inc., Montclair, N. J., presided.

Mr. Blakelock's paper, on the Application of Micromotion Study to the Manufacture of Small Parts, was illustrated by motion pictures. In outlining the fundamentals of such study of the motions of the operator it was pointed out that micromotion study is not only practical but is highly essential to the modern job analyst. Progress in improving the human factor in methods has not kept pace with the improvement in machines and tools, Mr. Blakelock said, although this field offers wonderful possibilities because of the large economic loss occasioned by ill directed and ineffective effort. It was pointed out that when thoroughly understood, "best motion practice fundamentals may be applied without the use of motion pictures; when practiced, they have a decided effect upon the skill of the operator.

Examples of the application of micromotion principles to specific jobs included the swaging of a stud and plate, a punch press operation. This showed the effect of motion considerations upon the design of die used, and was said to have resulted in an increase of 82 per cent in production. In another application, the assembly of a magnetic switch, was shown the effect of proper placing of materials for small assembly work. A burning operation on another piece demonstrated the results obtained by use of motions entailing the least fatigue.

Bridgeport Chain Takes Over Hendryx Line

To provide for developments in its other lines of manufacture, the Andrew B. Hendryx Co., New Haven, Conn., has sold its entire chain business and chain equipment to The Bridgeport Chain & Mfg. Co., Bridgeport Conn. The transfer becomes effective immediately.

The Bridgeport Chain & Mfg. Co. will continue to manufacture the full line of standard and special sizes of single and double jack chain, safe or register chain, ladder chain, sprocket chain, safety chain and plumbers' chain. The Bridgeport Chain & Mfg. Co. is part of the Round organization, which includes, in addition to the Bridgeport plant, the Cleveland Chain & Mfg. Co., D. Round & Son, the Krein Chain Co. and Seattle Chain & Mfg. Co.

Baldwin-Duckworth Chain Elects Officers

The Baldwin-Duckworth Chain Corporation, recently formed by a consolidation of the Baldwin Chain & Mfg. Co., Worcester, Mass., and the Duckworth Chain & Mfg. Co., Springfield, Mass., will operate its plants as separate units.

The officers of the new corporation are: President, George H. Empsall, Springfield; vice-presidents, William E. Gilbert, Springfield, and William F. Cole, Worcester; treasurer, Frank J. Weschler, Worcester; directors, these officers and Henry P. Blumenauer, George T. Dewey, William H. Gates, and George A. Gaskill, all of Worcester, and Edward K. Allen, Harold G. Duckworth, George D. Gilbert and George M. Hendee, all of Springfield. Mr. Empsall will have immediate charge of the Duckworth plant, and Mr. Weschler of the Worcester plant.

▲▲▲ PERSONALS ▲▲▲

EDWARD D. KILBURN, vice-president and general sales manager of the Westinghouse Electric & Mfg. Co., East Pittsburgh, has resigned and will engage in business on his own account, with offices at 150 Broadway, New York. Mr. Kilburn was graduated from Cornell University in 1906, and has been continuously identified with the Westinghouse organization since that time. He has served successively as manager of the New York power and railroad department, manager of the New York district office, vice-president and general manager of the Westinghouse International Co., and for the last three years as vice-president and general manager of sales.

E. D. KILBURN

W. S. RUGG

S. M. KINTNER

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W. S. RUGG, vice-president of the Westinghouse Electric & Mfg. Co., will have charge of its engineering and sales activities, with the title of vice-president in charge of engineering and sales. Mr. Rugg is a graduate of Cornell University, and went with the Westinghouse company in 1892. After gaining experience in engineering and sales work at the Chicago office, he went to New York, where he was appointed manager of the company's office in 1909. In 1917 he became manager of the railroad department, and later of the marine department, with headquarters at East Pittsburgh. In 1920 he was made assistant to H. D. SHUTE, then vice-president in charge of sales, and two years later became general sales manager. Since 1925 he has been vice-president in charge of engineering.

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S. M. KINTNER, director of the Westinghouse research laboratory, has been named assistant vice-president, and assumes engineering department duties under general direction of W. S. Rugg. Mr. Kintner was graduated from Purdue University in 1904. A short time later he became a member of the faculty of the Western University of Pennsylvania, now the University of Pittsburgh. Here he was associated with Prof. Reginald Sessenden in important electrical experimental work. Subsequently he became identified with the Westinghouse company as a research engineer, where he was active in railroad electrification work.

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W. P. SNYDER, JR., president, W. P. Snyder & Co., Pittsburgh, and of the Snyder Mining Co., has been elected a director of the Crucible Steel Co. of America. The Mining company, organized last year to operate ore mines, is owned jointly by the Snyder interests and the Crucible company.

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IRVING H. BENSON, general superintendent of work equipment, Boston & Maine Railroad, Boston, has resigned to become identified with a Chicago steam shovel manufacturing company.

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RALPH R. NEWQUIST has been appointed sales engineer of the Chicago office of the Reliance Electric & Engineering Co., Cleveland.

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E. H. MCCARTY, who resigned as vice-president and general sales manager of the Nash Motors Co., Kenosha, Wis., about a year ago to take a long rest, has rejoined the company as vice-president and general manager.

MAX W. BABB, vice-president of the Allis-Chalmers Mfg. Co., Milwaukee, has been appointed a director of the Federal Reserve Bank of the Seventh District at Chicago, to fill the unexpired term of Augustus H. Vogel, Milwaukee, who died recently.

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WALTER HARNISCHFEGER, vice-president of the Harnischfeger Corporation, Milwaukee, has returned from a business tour of continental Europe lasting three months.

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T. M. GIRDLER, chairman of the board of Republic Steel Corporation, has been elected a director of the newly consolidated Chase-Equitable-Interstate Bank.

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A. F. FRANZ, heretofore of the Lakeside works of the Otis Steel Co., has become assistant open-hearth superintendent of the Alan Wood Steel Co., Conshohocken, Pa.

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M. L. CARR has been appointed staff engineer of the Pittsburgh Testing Laboratory, Pittsburgh. He was formerly affiliated with Barrington Associates, New York, and prior to that time he was connected with the Safe Cabinet Co., Marietta, Ohio.

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SAUNDERS NORVELL, president, Remington Arms Co., New York, will be one of the speakers at the annual dinner of the Illinois Manufacturers' Costs Association, April 29, at the Congress Hotel, Chicago.

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ROBERT J. HARRY, who has been assistant electrical superintendent at the Homestead works, Carnegie Steel Co., has become identified with the Alliance Machine Co., Alliance, Ohio, the appointment being effective April 15.

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CHARLES R. POLLARD, for many years identified with the home office of the Alexander Milburn Co., Baltimore, has been appointed Chicago district representative, with office at 220 South State Street.

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A. A. HELLER, president, International Oxygen Co., Newark, N. J., has sailed for Europe for a stay of several months and plans to visit France, Germany and Russia.

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L. B. DOAN, assistant chief engineer, Electric Boat Co., New London, Conn., was scheduled to address a joint meeting of the Providence section of the American Society of Mechanical Engineers, with the machine shop section and designing and drafting section of the Providence

Engineering Society, April 22, on "Diesel Engines in Connection with Marine Work."

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A. W. LUCAS, formerly identified with the Crucible Steel Co. of America, has been made New England district manager, with office and warehouse at Hartford, Conn., by the Jessop Steel Co., Washington, Pa.

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L. M. JORDAN, previously identified with the Studebaker Corporation for 18 years, investigating chemical and metallurgical processes, has been appointed sales representative of the South Bend, Ind., district, by Hevi Duty Electric Co., Milwaukee.

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RICHARD ARMSTRONG, metallurgist, Union Steel Casting Co., Pittsburgh, addressed the metallurgical students of the University of Pittsburgh, on the metallurgy of steel castings, on April 10.

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L. W. HAYDEN has been appointed resident engineer, with offices in Philadelphia, by the Hevi Duty Electric Co., Milwaukee. His territory will include eastern Pennsylvania, Maryland, Virginia, Delaware, District of Columbia, and the southern part of New Jersey.

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CLAYTON A. NENNO has acquired an interest in the J. M. & L. A. Osborn Co., sheet steel jobber, Cleveland, and has been elected a vice-president and member of the board of directors of the company and appointed manager of its Buffalo warehouse. Mr. Nenno was formerly connected with the Osborn Co. but for several years has been in business for himself in Buffalo selling brass, nickel and other products.

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ROBERT F. BLAIR, since 1922 vice-president and manager of the Pittsburgh branch of the Standard Supply & Equipment Co., Philadelphia, has been elected president of that company, succeeding FITZWILLIAMS SARGENT, who has been named chairman of the executive committee. Mr. Blair has been engaged in the mill supply business in the Pittsburgh district during the greater part of his life, and in his new capacity will divide his time between Pittsburgh and Philadelphia. VANCE C. BOYD, who has been secretary of the company, and manager of the Philadelphia branch, has been elected vice-president and will continue his headquarters at Philadelphia. ROBERT GIBSON succeeds Mr. Boyd as secretary of the company, and FRANK W. NEWTON becomes assistant secretary. WINTHROP SARGENT, JR., continues as chairman of the board of the Standard company, and DAVID LONGACRE as treasurer.

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W. W. RUNYAN, formerly associated with the Max Solomon Co. and more recently with the Jay G. Stephens Corporation, both of Pittsburgh, has become indentified with the Pittsburgh office of Luria Brothers & Co., Inc.

JOHN A. TOPPING, who remains a director of the Republic Steel Corporation, will have offices apart from those of the Republic Steel Corporation in the Lincoln Building, 60 East Forty-second Street, New York, when he moves there April 30.

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AMBROSE SWASEY, chairman of the board of the Warner & Swasey Co., Cleveland, has been honored by the award of the city's medal for public service. The award was made by the Cleveland Chamber of Commerce at its annual meeting, April 15, when the names of three distinguished Clevelanders including Mr. Swasey were added to the honored list. In connection with this award tribute was made to Mr. Swasey in the following citation.

AMBROSE SWASEY

Generous supporter of charitable, educational, civic and scientific institutions of Cleveland, and of the nation.

Authority on instruments of precision.

Inventor and builder of unique scientific instruments which have essentially added to human knowledge and welfare.

Holder of the highest scientific honors: Member of the National Academy of Sciences, Fellow of the Royal Astronomical Society, Chevalier Legion d'Honneur, founder-member and past-president of the American Society of Mechanical Engineers, member of the British Institute of Mechanical Engineers.

A distinguished citizen who is honored not only in this country, but also throughout the civilized world; whose character and achievements shed glory and honor upon the City of Cleveland.

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JOHN. C. ARDAGH is one of three men of the Lincoln Electric Co. to be transferred from the manufacturing district to the welder service division. He will have headquarters in the Monadnock Block, Chicago. The others transferred are R. A. KYLE, to 136 Liberty Street, New York, and ROBERT NEWTON to the Cleveland district.

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J. M. SCHLENDORF, formerly vice-president in charge of sales of Central Alloy Steel Corporation, is made sales manager of alloy steel products. NORMAN FOY, Birmingham district manager of the old Republic organization, has been made sales manager of mild steel products, with headquarters at Youngstown. HARRY RHODEHOUSE has been appointed traffic manager and W. H. OHL has been named as controller. Both held similar positions with the Republic Iron & Steel Co.

Dr. St. John Forms X-Ray Service Corporation

The formation of St. John X-Ray Service Corporation by Dr. Ancel St. John and Herbert R. Isenburger, 505 Fifth Avenue, New York, is announced. The new organization will carry on X-ray inspection and sales work hitherto carried on by them individually.

Gray Iron Institute to Have Research Engineer

The comprehensive program of technical activities undertaken by the Gray Iron Institute, Cleveland, received further impetus at the April meeting of the board of directors in Cleveland when the employment of a full time research engineer was authorized to direct the technical activities of the institute. Direct assistance to its members in the solving of many of the technical problems in the production and selling of gray iron castings has for some time been rendered by the institute to its members. With the increase in membership the need of an expert, full-time, technical director or research engineer has become apparent. A selection has not yet been made for this position but it is the desire of the institute management that the best available man be employed for he will be in a position to assist directly each member.

Waste Elimination Prize Offered

A cash prize of $50 is offered by the advisory board of the National Industrial Equipment Exposition, 308 West Washington Street, Chicago, for the best suggestion or idea for waste elimination advanced by any employee in any manufacturing plant. The award will be made to the employee submitting the best letter and most workable suggestion on the subject, and a certificate will be given to the plant where he is employed. All suggestions must be in the hands of the award committee by midnight of May 30.

Practicability of the suggestion and the quality of the suggestion itself will be the basis of the award. Any company is eligible to send in for a consideration three suggestions from employees. Each suggestion should be covered in a letter of not more than 300 words.

▲ ▲ ▲ OBITUARY ▲ ▲ ▲

ELMER T. MCCLEARY, president, Republic Steel Corporation, died at a Youngstown hospital on April 22 after one week's illness, following an operation. Born of a family of iron makers at Pine Grove Furnace, Cumberland County, Pa., he attended the public schools of Harrisburg and Pennsylvania State College, having been graduated as a metallurgist from the latter institution in 1901. He began his career with the Diamond State Steel Co., Wilmington, Del., but later went to Youngstown as metallurgist at the Ohio works, Carnegie Steel Co. In 1906, when the Youngstown Sheet & Tube Co. began to build its blast furnaces and steel plant, he went with the company as chief chemist. He later became superintendent of blast furnaces, superintendent of the steel department, assistant general superintendent, and in 1923, when the Sheet & Tube company acquired the Steel & Tube Co. of America and the Brier Hill Steel Co., he was appointed operating manager of the Youngstown district properties. He became assistant vice-president in 1924 and vice-president in January, 1926. With W. C. Reilly, senior vice-president in charge of operations for the Youngstown company, Mr. McCleary managed the properties of the company during the war. He was one of a committee of three named by the Government to determine steel requirements in the shell section of the ordnance department. In April, 1928, he became president of the Republic Iron & Steel Co. and continued in that capacity until he was made president a few weeks ago of the newly consolidated Republic Steel Corporation.

E. T. McCleary

F. D. Wanning

G. W. Jones

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F. D. WANNING, vice-president and chairman of the board of the Farrel-Birmingham Co., Ansonia, Conn., died at the New Haven Hospital, New Haven, Conn., on April 7, following a long illness. He was born on March 11, 1873, and attended the Derby high school. After his graduation from Yale University in 1894, he entered the employ of the Birmingham Iron Foundry in the engineering department. When the Farrel Foundry & Machine Co. merged into the Farrel-Birmingham Co. he was chosen vice-president and chairman of the board, which positions he held at the time of his death.

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GEORGE W. JONES, until his retirement on Feb. 1 manager of sales for the Pittsburgh Steel Co., Pittsburgh, died in that city on April 21, following a long illness. He was born in Wales and came to this country when 13 years old. He became associated with the Pittsburgh company in a sales capacity in 1908, later having served as assistant manager of the New York office, and manager of the Chicago office. In 1921 he was made assistant manager of sales, and five years later manager of sales.

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GEORGE F. WHITNEY, secretary and treasurer of the Whitney Mfg. Co., Hartford, Conn., died Monday, April 14, at his home in that city following an illness of two years. He was born in Westbrook, Me., March 20, 1846. For several years he was connected with Pratt & Whitney Co., of which Amos Whitney, his cousin and brother-in-law, was a founder. Mr. Whitney had been associated with the Whitney Mfg. Co. since its organization and had been treasurer since 1920.

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CHRISTIAN SCHOLTKA, one of the founders of the Nordberg Mfg. Co., Milwaukee, and general superintendent of its plants until his retirement in 1925, died April 16, at Milwaukee Hospital, after an illness of six months. He was 75 years of age and a native of Germany, coming to the United States as an infant. He learned the machinist's trade and was connected with a number of large local manufacturing industries before joining with other young engineers and shop executives in forming the Nordberg Mfg. Co. Mr. Scholtka became one of the best known production executives in the Middle West and also achieved high rank as a designer and builder of Corliss engines and other prime movers.

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A. E. STARBUCK, since January, 1928, president of the American Stainless Steel Co., Pittsburgh, died at his home in that city on April 15. He was born in Iowa 59 years ago, and had spent the greater part of his business career in Indiana. Before going with the Stainless Steel company, he had been secretary of the Haynes Automobile Co., Kokomo, Ind.

—

HARRY HARTSHORNE SEABROOK, for almost 25 years president of the Nason Mfg. Co., New York, died in his sleep, April 9, at his home in New York, aged 71 years.

—

FRED V. MCGRAW, sales manager, Ray Day Piston Co., Detroit, died in the Mount Carmel Hospital, Columbus, Ohio, on April 14, as the result of injuries suffered in an automobile accident. He was 42 years of age.

Larger Use of Electric Power in March

Electric energy consumption of about 3600 scattered manufacturing plants in March is reported by *Electrical World* as 125, compared with 123.5 for the same number of working days in February. The gain was 1.2 per cent. The figures are based on 100 as the average monthly productive activity in 1923-1925.

The metal industries group showed a larger gain than the average, going from 135 to 139. This was wholly within the plants working up iron and steel into finished products, which advanced from 130.5 to 137.2. Rolling mills and steel plants declined to 142.3 from 143.

Automobile plants, including those making parts, showed a drop from 116.6 to 113.2, and shipbuilding a decline from 125.4 to 122.4.

The United States supplied 31 per cent and the United Kingdom 62 per cent of the mining machinery and equipment imported into the Union of South Africa in 1928, according to a report received by the Industrial Machinery Division, Department of Commerce, from Trade Commissioner Samuel H. Day, Johannesburg.

W. W. MACON
Editor

THE IRON AGE

A. I. FINDLEY
Editor Emeritus

ESTABLISHED 1855

Steel Tonnage Has Been Large

PRODUCTION of steel as shown by precise tonnage comparisons has been running heavier than is inferred in some quarters. Misconception is frequently produced by our way of magnifying either way any departure there may be from the average, also by the fact that capacity has increased whereby a given tonnage today represents a smaller percentage of engagement than in the past.

For an up-to-date comparison January may be disregarded. April can be estimated with sufficient closeness for practical purposes by taking it equal to March, for there was slightly decreasing production in the earlier part of March and there has been sustained production since the beginning of this month.

Comparing production in February, March and April with the same months of other years we have 12 per cent decrease from last year, practically no change from 1928 and increases over previous years, the increase over 1925 being 11 per cent. That was quite an active year, making a new record, and 11 per cent increase in five years is not much below the general rate of increase shown after the war and up to 1929, when there was an admittedly remarkable bulge.

Actual figures may be cited to impress the point. For a correct comparison certain adjustments must be made. Through the year 1927 the monthly ingot production reports included electric and crucible, which have since been excluded, and we make an allowance for them for the subsequent years. For several of the years an adjustment must be made on account of an extra working day. The adjusted figures are as follows:

Production of All Ingots, February, March and April (Gross Tons)

1925	11,480,000	1928	12,820,000
1926	12,204,000	1929	14,466,000
1927	12,307,000	1930	12,772,000

Periods are adjusted when necessary to a uniform 76 working days, and as the year contains 311 working days the annual rates would be one or two per cent more than four times the figures given. No such annual production occurs, however, on account of seasonal variation. (It may be of interest to mention, in passing, that actual production was the following multiples of the figures given above: 1925, 3.82; 1926, 3.84; 1927, 3.55; 1928, 3.92; 1929, 3.68. The average of these is 3.76 and applying that would make 48,000,000 tons for this year.)

Nobody has thought of suggesting that steel is not getting its full share of present day business activity, the divergence if any being the other way about. No doubt this engenders fear in some quarters that steel tonnage has been too good to last, or a feeling that general business must improve to enable steel to maintain its position. There is a favorable augury, however, in the fact that steel is well maintaining its tonnage this month whereas in each of the four years prior to 1928 there was a decrease from March to April, the decreases being large in two cases.

One recalls 1926 as a very good steel year throughout, and the three-month comparison shows a tonnage gain this year of 4.7 per cent. On account of increased capacity, however, production lately has represented only 91 per cent as large engagement of capacity as was the case four years ago.

The Will to Stabilize Employment

EMPLOYERS must cultivate the habit of stabilizing employment. They must make it as much of their business practice as the habit of filing or that of using typewriters. Such is the burden of the fresh emphasis that a committee appointed by the Governor of New York State has put on the problem of reducing unemployment.

The committee has made a preliminary report. There is no question that it will be well received. No one dissents from the ideal of general continuous employment. What has been taking place in industry is a wider acceptance of the principle that continuity is not necessarily impracticable. In fact, the committee reports that it has examined the plans and experiences of more than 200 plants engaged in reducing unemployment and asserts there must be something in the idea beyond mere words, "When more than 200 companies, including some of the largest corporations in the United States, have devoted a great amount of time and effort to working out plans for regularization."

Certain it is that we have made great progress in lengthening the working periods of so-called seasonal industries. Winter weather is no longer considered a serious barrier to construction work. Agreement is pretty general that the labor item is the last to be readjusted in a recession, so strongly are we committed to conserving the buying power of the wage-earner. The committee believes "present mass production methods of American industry are probably here to stay, at least for many years to come," and "the continued success of large scale production, of quick turnover, and of installment buying hinges upon steady employment for the individual."

Pending the further report, this Committee of Sta-

bilization of Industry for the Prevention of Unemployment has announced it will hold a series of conferences beginning May 1 with manufacturers and business men throughout the State. Its efforts are therefore directed to the private employer as well as to urging a measure of control in dispensing public work. They comprehend covering job stabilization indefinitely rather than present alleviation of idleness. The need of periodic house cleaning, repairs and renovation in factories in slack times gets therefore prominent consideration in the committee's recommendations, as well as various methods of extra payments on dismissal, and so on. What the final report will probably strive to do is to encourage the will to stabilize.

Taking the Census

THE census that is now in the process of being taken has much praiseworthy inspiration from the standpoint of economic statistics, but effort and accomplishment are different things. An uncertain factor in the estimation of our national wealth has always been the value of real estate, wherefore the census is now essaying to get it; but only essaying, for the simple reason that most persons will evade the subject lest this bird comes home to roost on the perches of the local tax assessors. The assurances that the report is confidential and that the enumerating agent makes himself subject to severe penalty for betrayal does not get very far.

Another weak factor in our national economics has been the position of the farmer and the census is trying to correct that also, but anyone who has seen the four-page questionnaire that is submitted to the farmer will shake his head, while the farmer himself is already tearing his hair. All of the questions are rational and if answered correctly and completely would provide a valuable summary. We venture to think, however, that many farmers will not know how to answer and many will not even have the data of record.

Economic questionnaires that are foreordained to produce incorrect or even imperfect results are not only a waste of time but are worse. The counting of census returns is necessarily purely mechanical. The census authorities are proud of their intricate and ingenious devices for performing that task. We may suggest, however, that a good estimate is better than a bad accounting. We think we may inform the director of the census even now that he will get a total for the value of homes which is too low and that he will never know how many hens were owned by American farmers on April 1, 1930.

INTERNATIONAL movements in iron and steel scrap have reached large proportions. Total exports of the United States, Great Britain, France, Belgium and Luxemburg, and Germany last year were 1,856,300 tons. The imports of the same six nations were 714,700 tons. Thus the total trading covered more than 2,570,000 tons. Of the exports the United States contributed 30 per cent and of the imports Germany was first at 50 per cent. But aside from volume, perhaps because of it, have come complications growing out of accidental and premeditated inclusions of alloy scrap. Recently, for example, a consignment of scrap was sent to Germany, designated as Monel metal. It was returned and an analysis disclosed that there was only a small percentage of nickel present. Because of appearances, an uninitiated scrap dealer had unwittingly attempted to sell rustless steel scrap mixed with Monel metal as totally Monel metal. The remedies for all eventualities likely are fortunately now the subject of a special study by the Institute of Scrap Iron and Steel.

Too Much Stability?

THE sudden drop in copper from 18 to 14 cents a pound raises the question whether "stabilization" can go too far. It is not so long ago that "cut-throat competition" and "ruthless price cutting" were bugbears of American business and all efforts to put industry on a sane and profitable basis were applauded. But all things can be overdone. In holding copper at 18 cents for twelve months, without regard for drastic changes in market conditions in the meantime, producers discouraged buying and made an ultimate showdown inevitable. When consumption of a product falls off sharply, there is point to the Carnegie maxim that "the way to lift a market is to get under it."

Random Remarks on Current Economics

THE practical results of the naval conference may not be so definite as they are being portrayed, but anything that reduces the cost of military equipment and upkeep is economically beneficial to the people who have to pay for it. Whatever engagements our representatives may have made ought to receive the sanction of our Senate, but no word has yet come from Mr. Borah and we may imagine that he is trying to find some plausible objection.

* * *

The British chancellor of the exchequer has raised income taxes to be carried by the broad backs, who are obviously defined differently from what they are here. It has been pointed out that a $5,000 income has to pay about $500 a year in Great Britain and only $5 here, which is not a correct comparison inasmuch as we have State income taxes and property taxes in addition to the Federal. However, we might deduce the lesson that our $5,000 incomes ought to pay more and our $50,000 incomes less than they do.

* * *

The Great Atlantic & Pacific Tea Co. in its last year distributed over a billion dollars' worth of goods through 15,000 shops, realized a profit of 2.5 per cent on its sales and gave its patrons the advantage of a declining market to such an extent that they now obtain merchandise for 91 cents that last October cost $1. It is improbable that any governmental administration could approach such efficiency, no matter what academic socialists think about it.

* * *

An even more surprising thing in this report is the pettiness of the sale per store, which averages only about $70,000. The Department of Commerce has just made a survey of the business done by 24,000 retail outlets, aggregating about $5,000,000,000, and

averaging a little upward of $200,000. The Department's survey shows that 58.6 per cent of this business is on cash basis, 32.2 per cent on open credit and 9.2 per cent on instalment basis; that open credits average 68 days; and that the loss on them is only 0.6 per cent. This report pertains to department stores having especially to do with the distribution of wearing apparel. We must not therefore assume it to be a sample of the entire retail business of the country, which probably is about 15 times as great.

* * *

Another illuminating statistical revelation is a recently published analysis of investment trusts in the United States, showing that 117 of them had invested $2,710,626,000 in 1929, upon which interest and dividends received amounted to 3.6 per cent, while managerial expenses averaged 0.5 per cent. Additional income was profit from the sale of securities. The theory of investment trusts boils down to the idea that experts can invest funds more profitably than the average individual; but the average individual has in recent years been able to get 4.5 to 5 per cent in interest from savings banks, which indeed are themselves investment trusts. The analysis of 117 of the new investment trusts does not make us very enthusiastic in respect to them in general.

* * *

Railroad freight traffic in February, 1930, was 10 per cent under that of the corresponding month of the previous year. Orders received by the General Electric Co. during the first quarter of 1930 were 10 per cent less than in the corresponding quarter of 1929. There is more or less collateral evidence indicating the same degree of recession. This introduces consideration of the nature of the yardstick. Manifestly that is manufacture rather than consumption. It is well known that during 1929 we were over-manufacturing almost everything. A natural consequence was accumulation of goods for which gradual absorption has had to be awaited. Colonel Ayres, the Harvard Economic Society, and other authorities now discern signs of business improvement, which means that absorption is nearly completed. While we have apparently had a contraction of about 10 per cent in manufacture as compared with a year ago, there has never been any thought that there was a contraction of the same order in consumption. The distinction is of some importance.

CORRESPONDENCE

Single vs. Multiple-Operator Welding Machines

To the Editor: In your issue of March 13, on page 793, is comment on the comparative economy of single and multiple-operator arc welding units, the point being that in spite of its lower electrical efficiency the constant potential unit is a more efficient and economical apparatus than variable voltage units. The conclusion is based on three factors—first cost, upkeep and portability—as determined by experience at Newport News Shipbuilding & Dry Dock Co. yard.

(a) *First cost.* The statement is made that the constant potential machine has a lower first cost than the variable voltage machine. If a 1000-amp. constant potential set (capable of 25 per cent overload for intermittent periods) is compared to four 300-amp. machines (with 20 per cent continuous overload capacity and nearly 50 per cent welding capacity in excess of the constant potential unit) we may compare the first cost as follows:

1000-amp. constant potential unit.....	$1,900	
Four Newport News Shipbuilding & Dry Dock resistors manufactured by themselves, each $350.....	1,400	
		$3,300
Four 300-amp. portable variable voltage arc welding sets		$3,180

We therefore see that the first statement needs qualification. Apparently the writer compared the first cost of the motor-generator set with the first cost of four complete welding units without adding the necessary resistance units. This brief statement takes no account of other things, such as the additional wiring to carry the current from the constant potential set to the welder (at least one dollar per foot over the cost of carrying 3-phase power to the set) and the cost of truck or cradle to make these large sets portable. Adding these at the lowest figure, the comparative totals would be $3,600 for the constant potential against $3,180 for the variable voltage sets.

(b) *Upkeep.* The statement that the upkeep cost of variable voltage machines by Newport News Shipbuilding & Dry Dock Co. is much higher than the upkeep of constant potential units is made in the following quotation:

> "In no case have any of the multiple-operator sets referred to been shut down for repairs from normal operating conditions, whereas experience has shown that at least 10 per cent of the single-operator sets are always in the shop for repairs."

It is hard to understand why there should be less difficulty with a 60-kw. machine than with a 15-kw. set. Inherently there is no reason for this. I might cite many other users whose experience does not check that at Newport News. Results at the latter place may be due to overloaded or inadequate equipment, or to the personnel of the maintenance crew.

(c) *Portability.* The article in question evidently is comparing the portability of a resistance unit to the portability of a 300-amp. set. Obviously the resistance unit weighs less and therefore can be picked up with less effort than a motor-generator set, but portability also implies the necessity of carrying the current from the constant potential set to this resistance unit and thence to the operator. In order to do this either the large motor-generator set must be carried to the work, or an undue investment in copper made to carry the low-voltage current to the work. As a matter of fact, these large sets are transported to the work at Newport News, so it is difficult for me to understand how superior portability can be claimed for a 60-kw. set weighing several tons to a motor-generator set on a wheeled truck weighing less than one-quarter as much.

No mention has been made to the comparative costs of operation, to the comparative interference of operators when working on the two systems, and to the comparative outputs of feet of welding per operator. This is brushed aside by the statement that "The diversity factor insures the maintenance of a relatively constant load on the machine." It is evident that with the two systems the following would be true—there will be either no arcs on, or one, two, three or four arcs will be in operation at any one time. In the following tabulation the various conditions are evaluated, based on power cost at 2c. per kwhr.,

The Week in Business

Drift of Current Financial and Economic Opinion

FAVORABLE developments are seen in the improvement in commodity prices and in volume of activity in April. This is regarded by Harvard Economic Society as "probably marking the end of the business recession," particularly as the improvement has appeared also in Europe.

That authority expects that the physical volume of business will expand, during the second half-year, by more than the normal seasonal amount. General manufacturing, railroad freight traffic and construction work, which regularly average higher at that time, are looked to for a major portion of the evidence of gain.

Recovery to normal levels will be delayed, in the opinion of many financial writers. Benjamin Baker, in *Annalist*, for example, regards the present as "part of a broad valley of depression out of which business is not likely to emerge in much less than six months." He compares the situation to that of 1924 and finds many points in common.

Maladjustment between production and consumption, this observer thinks, "is due to general over-production and the forcing of products upon the consuming public through an extension of credit on the installment plan, which for the time being has overtaxed the absorbing power of the consumers."

It appears to the National Industrial Conference Board that "the low point of 1930 has been reached. Signs of returning confidence should, by the beginning of the summer, develop into a deep faith that the time is ripe for a new upward movement."

Bonds Providing Money for New Construction

Marked change in the character of new financing is noted by Alexander Hamilton Institute. Long-term bonds have come to the fore with a rush, first-quarter flotations having been much the largest in seven years. The institute points out that this type of security made up more than two-thirds of the new capital issues (domestic corporations) in the first quarter of 1930, against slightly over one-fourth those of last year. Meantime, issues of common stock fell from about one-half the total a year ago to a bit over one-fifth of this year's issues. Preferred stocks, also, dropped to only one-fourth the percentage they occupied last year, in the new corporate issues.

"Prevailing conditions encourage recourse to long-time bonds as the means of acquiring new capital at the lowest cost," is the explanation given, with the comment that conditions last year were a deterrent to this form of financing.

This organization has studied the index of business provided by machine tool orders, and finds "no particular improvement in industrial activity" indicated. The tie-up is based on the fact that machine tool orders reflect the rate of activity in machinery manufacturing, and the latter that of activity in all branches of industry.

Building Definitely Better

That building is definitely better is the conclusion of S. W. Straus & Co., based on reports covering March operations. This condition has a close connection with bond issues, and the Cleveland Trust Co. points to the fact that money raised by the sale of bonds is, as a rule, promptly spent for new construction and equipment.

a working day of 9 hr., and 300 days a year, and the results are obviously to the advantage of the single-operator set.

Conditions of Operation

Four Single-Operator Sets		One Four-Operator Sets		
		One Four-Operator Set		Yearly Savings of Single-Operator Sets
Operation	Losses, Kw.	Operation	Losses, Kw.	
All idling	6	Idling	7	$54
One operating, three idling	9	One arc	15.5	351
Two operating, two idling	12	Two arcs	28.5	891
Three operating, one idling	15	Three arcs	42.75	1,498
Four operating	18	Four arcs	57	2,406

It is difficult to understand why such statements as ascribed to the Newport News company should have been made, unless the explanation is found in the assertion that their automatic metallic electrode welding is four times as fast as their hand welding. I am of the opinion that when the present development in all types of welding becomes known to the staff of this large corporation their point of view will be radically changed.

J. F. LINCOLN,
President, Lincoln Electric Co.

Cleveland.

Mr. Owens Replies

To the Editor: As the subject of the relative advantages and disadvantages of single and multiple-operator sets has been very well covered by Chief Constructor Lottman and Chief Engineer Danz of the German Navy and myself, I will merely refer the reader to these references:

Paper on Metal Arc Welding In Germany, by Chief Constructor Lottman—*Marine Engineering*, September, 1929.

Discussion of Chief Constructor Lottman's paper, by Chief Engineer Danz (Berlin)—*Marine Engineering*, January, 1930.

My discussion of Chief Constructor Lottman's paper—*Marine Engineering*, February, 1930.

"Fundamentals of Welding"—Penton Publishing Co., Cleveland, chapter 15.

"Arc Welding" (Lincoln Prize Paper)—McGraw-Hill Book Co., page 39.

My paper on the Scientific Application of Welding to Ship Construction, Mr. Lincoln's discussion, and my rebuttal—1928 Year Book of the American Society of Naval Architects and Marine Engineers.

Relative to Mr. Lincoln's statement that "When the present development in all types of welding becomes known to the staff of this large corporation, their point of view will be radically changed," will state that the writer and the executives of the Newport News Shipbuilding & Dry Dock Co. are well acquainted not only with the various types of arc welding equipment (carbon and metal) but with other types, for example, gas, resistance and thermit. My statement on the cost of welding as done in our yard was arrived at jointly by the plant engineer, the welding foreman, and myself.

The fact that Westinghouse, General Electric and other companies manufacture, recommend, and sell multiple-operator arc welding equipment in addition to their single-operator equipment would indicate that both types of equipment have their uses, and neither type should be purchased by a user without careful consideration of all factors involved as covered by the foregoing references.

JAMES W. OWENS,
Director of Welding,
Newport News Shipbuilding & Dry Dock Co.

Newport News, Va.

Iron and Steel Markets

Output Makes Another Slight Gain

Motor Car Requirements Increasing—Heavy Construction Program and Pipe Lines Are Factors— Further Price Readjustments

CROSS currents in demand, coupled with a sensitive price situation and extreme caution among buyers, present a picture that is out of keeping with the actual performance of the iron and steel industry. Although specifying is from hand to mouth and the requirements of certain consuming lines are diminishing, the aggregate of all business has not only held up but has shown further slight improvement. This gain is attributable mainly to larger orders from the automobile industry, particularly the makers of low-priced cars.

The current moderate gain in motor car production is expected to continue into May, and it is now estimated that output in the second quarter will reach 1,100,000 cars, making a total of 2,100,000 for the first half of the year, compared with 3,500,000 in the same period last year.

Steel ingot output for the country at large, registering the increase in total business, now averages 80 per cent, compared with 78 per cent last week.

Railroad buying, which gave conspicuous support to the industry earlier in the year, is light, in consonance with the reduced earnings of the carriers. Merchant pipe demand, which depends to such a large extent on residential construction, shows little betterment. On the other hand, tin plate production is unchecked, further natural gas pipe line contracts have been placed, farm equipment plants remain active and evidences are accumulating that the heavy construction program, which received so much attention three or four months ago, is getting well under way.

Highway building promises to be a feature of the public works program in coming months. Of the week's awards of 9500 tons of reinforcing steel, 3000 tons was for road work. Highway machinery makers are taking steel in large quantities.

Fabricated structural steel awards, at 30,000 tons, are still subnormal. The weekly average of lettings so far this year is 30,750 tons, compared with 43,700 tons in the corresponding part of last year and 40,700 tons in 1928. New work that has come up for bids totals 34,000 tons, compared with 39,000 tons a week ago.

Line pipe awards of the week include a 300-mile gas line for the American Light & Traction Co., placed with the A. O. Smith Corporation, and 450 miles of seamless pipe to be laid from Amarillo, Tex., ordered from the National Tube Co. The Lone Star Gas Co. plans to construct a 900-mile line from the Texas Panhandle to Nebraska and Iowa. Shipments of plates to the Milwaukee pipe fabricator are heavy.

Continued activity in shipbuilding is insured by the award of mail contracts for 10 vessels, eight to the United Fruit Line and two to the Grace Line.

Steel prices have undergone a number of further recessions. Continuous mill sheets have declined $2 a ton, No. 10 gage to 1.80c. and No. 13 to 1.95c., Pittsburgh. No. 10 light plates and No. 13 blue annealed sheets are also down $2 a ton, the former to 2c. and the latter to 2.15c., Pittsburgh. Long ternes are now rather commonly available at 3.80c., compared with a recent range of 3.90c. to 4c. Prices on merchant wire products have been revised to conform with the recent reduction on wire nails.

Scrap markets, which in the past have frequently forecast the trend of steel production, are still uniformly weak, with heavy melting grade down 25c. at Pittsburgh, Philadelphia and St. Louis.

Basic pig iron has declined 25c. a ton to $18.75, delivered, on a sale of 5000 tons to a steel plant in the Philadelphia district. Pig iron demand in the country at large shows little change, although that change appears to be for the better. Steel foundries serving the railroads are using less iron, but melters doing automobile work are taking 15 per cent more tonnage than a month ago and the requirements of the cast iron pipe plants are expanding. Cast pipe business is featured by the placing of 12,000 tons in New England, a contract for 6500 tons for a California sugar company and a purchase of 2200 tons by the city of Milwaukee.

Prime Western zinc has dipped to 4.75c. a lb., East St. Louis, its lowest level since April 4, 1922.

Fabricated structural steel awards in March (computed) totaled 248,000 tons, against 276,000 tons in February. Computed bookings for the first three months were 772,000 tons, compared with 897,050 tons in 1929.

Sheet sales of independent mills in March totaled 299,764 tons, against 203,315 tons in February, a gain of 47 per cent.

The Continental Steel Cartel has opened a central office for price control at Brussels, Belgium.

THE IRON AGE composite prices are unchanged. Pig iron remains at $17.75 a gross ton for the eighth week and finished steel at 2.264c. a lb. for the fourth week.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

	Apr. 22, 1930	Apr. 15, 1930	Mar. 25, 1930	Apr. 23, 1929
Pig Iron, Per Gross Ton:				
No. 2 fdy., Philadelphia	$20.26	$20.26	$20.26	$21.76
No. 2, Valley furnace	18.50	18.50	18.50	18.00
No. 2 Southern, Cin'ti	16.69	16.69	16.69	18.69
No. 2, Birmingham	14.00	14.00	14.00	15.50
No. 2 foundry, Chicago*	19.50	19.50	19.50	20.00
Basic, del'd eastern Pa.	*18.75*	19.00	19.00	20.25
Basic, Valley furnace	18.50	18.50	18.50	18.00
Valley Bessemer, del'd P'gh	20.76	20.76	20.76	20.26
Malleable, Chicago*	19.50	19.50	19.50	20.00
Malleable, Valley	19.00	19.00	19.00	18.50
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	94.00	94.00	94.00	105.00
Rails, Billets, Etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	33.00	33.00	33.00	36.00
Sheet bars, Pittsburgh	33.00	33.00	33.00	36.00
Slabs, Pittsburgh	33.00	33.00	33.00	36.00
Forging billets, Pittsburgh	38.00	38.00	38.00	41.00
Wire rods, Pittsburgh	38.00	38.00	38.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.85
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.80	1.80	1.85	1.95
Bars, Chicago	1.90	1.90	1.95	2.05
Bars, Cleveland	1.80	1.80	1.85	1.95
Bars, New York	2.14	2.14	2.19	2.29
Tank plates, Pittsburgh	1.80	1.80	1.80	1.95
Tank plates, Chicago	1.90	1.90	1.90	2.05
Tank plates, New York	2.02½	2.02½	2.07½	2.22½
Structural shapes, Pittsburgh	1.80	1.80	1.80	1.95
Structural shapes, Chicago	1.90	1.90	1.90	2.05
Structural shapes, New York	1.99½	1.99½	2.04½	2.19½
Cold-finished bars, Pittsburgh	2.10	2.10	2.10	2.30
Hot-rolled strips, Pittsburgh	1.70	1.70	1.75	1.90
Cold-rolled strips, Pittsburgh	2.55	2.55	2.55	2.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

	Apr. 22, 1930	Apr. 15, 1930	Mar. 25, 1930	Apr. 23, 1929
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.55	2.55	2.65	2.85
Sheets, black, No. 24, Chicago dist. mill	2.65	2.65	2.75	3.05
Sheets, galv., No. 24, P'gh	3.30	3.30	3.30	3.60
Sheets, galv., No. 24, Chicago dist. mill	3.40	3.40	3.40	3.80
Sheets, blue, No. 13, P'gh	*2.15*	2.25	2.25	2.10
Sheets, blue, No. 13, Chicago dist. mill	*2.25*	2.35	2.35	2.30
Wire nails, Pittsburgh	2.15	2.15	2.25	2.65
Wire nails, Chicago dist. mill	2.25	2.25	2.35	2.70
Plain wire, Pittsburgh	2.40	2.40	2.40	2.50
Plain wire, Chicago dist. mill	2.45	2.45	2.45	2.55
Barbed wire, galv., Pittsburgh	2.95	2.95	2.95	3.30
Barbed wire, galv., Chicago dist. mill	3.00	3.00	3.00	3.35
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.35
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	*$15.75*	$16.00	$16.25	$18.50
Heavy melting steel, Phila	*13.75*	14.00	14.50	17.00
Heavy melting steel, Chicago	13.00	13.00	13.00	16.00
Carwheels, Chicago	14.50	14.50	14.50	14.50
Carwheels, Philadelphia	15.00	15.00	15.00	16.50
No. 1 cast, Pittsburgh	14.50	14.50	14.50	15.50
No. 1 cast, Philadelphia	15.00	15.00	15.00	16.50
No. 1 cast, Ch'go (net ton)	13.50	13.50	13.75	16.00
No. 1 RR. wrot., Phila	15.00	15.00	15.00	16.00
No. 1 RR. wrot., Ch'go (net)	*11.75*	12.25	12.25	14.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.60	$2.60	$2.60	$2.75
Foundry coke, prompt	3.50	3.50	3.50	3.75
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	14.12½	14.12½	18.12½	18.12½
Electrolytic copper, refinery	13.75	13.75	17.75	17.75
Tin (Straits), New York	*35.87½*	36.37½	37.87½	44.75
Zinc, East St. Louis	*4.75*	4.90	4.85	6.60
Zinc, New York	*5.10*	5.25	5.20	6.95
Lead, St. Louis	5.40	5.40	5.55	6.85
Lead, New York	5.50	5.50	5.65	7.00
Antimony (Asiatic), N. Y.	*7.75*	8.00	7.87½	9.50

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

PITTSBURGH

Steel Specifications Gain Slightly—New Building Programs Showing Results

PITTSBURGH, April 22.—Further slight gains in specifications for steel products during the last week have given local steel producers more assurance. At the same time current tonnage releases are of such a nature that the prospect of any material increase in business during the next few weeks is remote.

Preliminary estimates of the probable May requirements of several large automobile makers indicate that motor car production next month will show a slight increase over April, but conservative opinion regarding that all-important industry is not at all assured that corresponding gains will be registered in the summer months. However, if automobile production does decline again, it is not unlikely that heavier releases from the construction industry will more than offset losses from that source.

Pittsburgh district companies are beginning to feel for the first time definite results from the heavy new construction programs announced three or four months ago. Structural steel and reinforcing bars required for large civil engineering projects are now beginning to reach the mills, and definite inquiry for such jobs is coming out in better volume. This has resulted in better operations in the larger fabricating shops.

While bar and shape mills have stepped up their schedules slightly, the outlook for plates is hardly so satisfactory, as buying of barges has been very limited, and railroad car builders are not specifying in significant volume. The railroads as a whole are not taking steel at the rate which had been expected for this season, and specifications for track accessories have again fallen off after a fair amount of activity around the beginning of the month.

Though tin plate operations are unchecked, current releases are lighter and some slight downward readjustment may be necessary before canning companies are able to gage their needs more definitely. No unfavorable crop reports have been made as yet, and there is still nothing on the business horizon to indicate that the aggregate pack this year will fall much below that of 1929.

Specifications for other flat-rolled products, such as sheets and strip, continue to increase slightly, and prices are no weaker. Reported concessions in the Detroit district are not being made so freely in other parts of the country, although a few producers persist in their attempts to keep their mills running at the expense of prices.

Steel ingot production in the immediate Pittsburgh district still ranges from 75 to 80 per cent of theoretical capacity, with the leading interest running at the higher figure. The rate in Youngstown is not quite so high and

varies more sharply from week to week than Pittsburgh schedules. The requirements of rail, structural and tin mills are largely responsible for the well sustained operating rates in this district. Pipe production is not above 55 per cent of capacity, sheet mills are running at about 70 per cent, and hot-rolled strip at 60 to 70 per cent. Bar operations range from 65 to 70 per cent, and plate departments are engaged at about the same rate.

Steel prices in general have not lost strength, and some efforts toward stabilization have been made in merchant wire products and sheets. Bolt and nut manufacturers, who are large users of wire and wire rods, do not wish to see the market reflect weakness in steel, and consequently are not actively seeking concessions. The same principle works in the case of semi-finished steel, which sellers have been able to hold at a rather high nominal price in view of buyers' disinclination to see an open break in the market. Demand for pig iron has shown little improvement, and shipments so far this month are about equal to those of March.

Scrap has again declined following the purchase of a fairly large tonnage at $16, Pittsburgh.

Semi-Finished Steel.— Stocks of semi-finished material have been allowed to decline in the last few weeks, as producers have abandoned the idea of accumulating material for possible shortage later in the year. The price situation is unchanged, with such buying as is being done bringing $33, Pittsburgh. Occasional slight shading is encountered, but not sufficient to justify a lower quotation at this time on billets, slabs and sheet bars. Consumers feel that this figure is too high as compared with selling prices of finished steel, but producers are firm in trying to hold the market. Wire rods are moving in fair volume, although weakness in nail and wire prices has forced large buyers of rods to adopt a cautious attitude.

Pig Iron.—Sales are still confined mostly to small lots, although one seller reports a fair volume of orders for basic iron in the last two weeks. Foundry iron is very quiet and, with the foundries of makers of heating equipment and sanitary ware still running at a low level, shipments are restricted. Local steel foundries specializing in railroad business are also less active, and hold-ups on pig iron are not uncommon.

Prices are unchanged at $18.50, Valley, for foundry and basic iron, and $19 for malleable and Bessemer. However, consumers are more disposed to hold out for price inducements than they were earlier in the year, and sales at present figures are by no means easy to negotiate unless consumers are extremely anxious to get iron.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Bars, Shapes and Plates.—Specifications were heavier last week with some makers, particularly for structural steel and reinforcing bars. Pending projects requiring heavy tonnages of reinforcing steel are coming out regularly, and the industry is just now beginning to feel the effects of the heavy construction program, which received so much attention three or four months ago. This promises to afford a good outlet for the heavier steel products for some months to come. A bridge over Turtle Creek at East Pittsburgh will require about 1400 tons of reinforcing bars.

Fabricating shops are busier than they were in March, although backlogs are not impressive. Car builders are taking plates in fair volume, and the rebuilding of 500 cars for the Virginian Railway will take a round tonnage of plates.

Demand for merchant steel bars is still restricted, although cold-finished units are specifying slightly heavier tonnages, and operations in the district now average at least 75 per cent. Prices are still weak, although in the immediate Pittsburgh district plates and shapes are holding, except in extreme cases, at 1.80c., Pittsburgh. Shading of $1 a ton has occurred on some orders. Bars are somewhat firmer, although concessions have been made in the Cleveland and Detroit districts, where 1.75c., Cleveland, is heard occasionally.

Tubular Goods.—The pipe business shows little improvement, although seasonal increases in some lines have stimulated operations in the industry as a whole. The average operating rate in this and the Youngstown district is now about 55 per cent of capacity, as compared with as low as 40 per cent a few weeks ago. Seamless units are fairly well engaged, but lap-weld mills have very little to do. Standard butt-weld pipe is moving to warehouses in fair volume, but shipments to the ultimate consumer are not so satisfactory. Most of the large line pipe projects now before the trade are being held up and definite new inquiries are lacking. Shipments of mechanical tubing to the automobile industry have been heavier in the last few weeks, but are still considerably below normal. Pipe prices in general are well maintained.

Wire Products.—Shipments of manufacturers' wire are holding at recent

Specifications for structural steel and reinforcing bars gain slightly, reflecting definite results of new construction program.

* * *

Strip steel specifications running ahead of those of March.

* * *

Concessions of $2 a ton on blue annealed sheets are more common.

* * *

Steel ingot output in Pittsburgh district 75 to 80 per cent, lower at Youngstown.

* * *

Scrap prices have again declined.

The Iron Age Composite Prices

Finished Steel

April 22, 1930, 2.264c. a Lb.

One week ago	2.264c.
One month ago	2.312c.
One year ago	2.412c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High	Low
1930	2.362c., Jan. 7;	2.264c., April 1
1929	2.412c., April 2;	2.362c., Oct. 29
1928	2.391c., Dec. 11;	2.314c., Jan. 3
1927	2.453c., Jan. 4;	2.293c., Oct. 25
1926	2.453c., Jan. 5;	2.403c., May 18
1925	2.560c., Jan. 6;	2.396c., Aug. 18

Pig Iron

April 22, 1930, $17.75 a Gross Ton

One week ago	$17.75
One month ago	17.75
One year ago	18.54

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High	Low
1930	$18.21, Jan. 7;	$17.75, March 4
1929	18.71, May 14;	18.21, Dec. 17
1928	18.59, Nov. 27;	17.04, July 24
1927	19.71, Jan. 4;	17.54, Nov. 1
1926	21.54, Jan. 5;	19.46, July 13
1925	22.50, Jan. 13;	18.96, July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.80c. to 1.85c.
F.o.b. Chicago	1.90c. to 2.00c.
Del'd Philadelphia	2.12c. to 2.17c.
Del'd New York	2.14c. to 2.19c.
F.o.b. Cleveland	1.80c.
F.o.b. Lackawanna	1.90c. to 1.95c.
F.o.b. Birmingham	2.00c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	1.85c.
F.o.b. Pittsburgh mills, cut lengths	2.20c.
F.o.b. Birmingham, mill lengths	2.00c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.80c. to 1.90c.
F.o.b. Chicago Heights mill	1.80c.
Del'd Philadelphia	2.12c. to 2.22c.

Iron

Common iron, f.o.b. Chicago	1.90c. to 2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.80c. to 1.85c.
F.o.b. Chicago	1.90c. to 2.00c.
F.o.b. Birmingham	2.00c.
Del'd Cleveland	1.99c.
Del'd Philadelphia	1.95c. to 2.00c.
F.o.b. Coatesville	1.85c. to 1.90c.
F.o.b. Sparrows Point	1.90c. to 1.95c.
F.o.b. Lackawanna	1.90c. to 1.95c.
Del'd New York	2.02½c. to 2.07½c.
C.i.f. Pacific ports	2.20c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.80c. to 1.85c.
F.o.b. Chicago	1.90c. to 2.00c.
F.o.b. Birmingham	2.00c.
F.o.b. Lackawanna	1.90c. to 1.95c.
F.o.b. Bethlehem	1.90c. to 1.95c.
Del'd Cleveland	1.99c.
Del'd Philadelphia	1.81c. to 1.86c.
Del'd New York	1.94½c. to 2.04½c.
C.i.f. Pacific Ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	1.80c. to 1.90c.
Wider than 6 in., P'gh	1.70c. to 1.80c.
6 in. and narrower, Chicago	1.90c. to 2.00c.
Wider than 6 in., Chicago	1.80c. to 1.90c.
Cooperage stock, P'gh	2.10c. to 2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.10c.
Bars, f.o.b. Chicago	2.10c.
Bars, Cleveland	2.10c.
Bars, Buffalo	2.10c.
Shafting, ground, f.o.b. mill	*2.45c. to 3.40c.
Strips, P'gh	2.55c. to 2.65c.
Strips, Cleveland	2.55c. to 2.65c.
Strips, del'd Chicago	2.85c. to 2.95c.
Strips, Worcester	2.80c. to 2.90c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	3.90c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Merchant Trade

	Base per Keg
Standard wire nails	$2.15 to 2.30
Cement coated nails	2.20 to 2.30
Galvanized nails	4.10 to 4.30

	Base per Lb.
Polished staples	2.65c. to 2.75c.
Galvanized staples	2.90c. to 3.00c.
Barbed wire, galvanized	2.85c. to 2.95c.
Annealed fence wire	2.35c. to 2.45c.
Galvanized wire, No. 9	2.80c. to 2.90c.
Woven wire fence (per net ton to retailers)	$65.00

To Manufacturing Trade

Bright hard wire, Nos. 6 to 9 gage	2.40c.
Spring wire	3.50c.

(Carload lots, f.o.b. Chicago)

Wire nails	$2.25 to $2.45 (keg)
Annealed fence wire	2.50c. to 2.60c. (lb.)
Bright hard wire to manufacturing trade	2.45c.

Anderson, Ind., mill prices are ordinary $1 a ton over Pittsburgh base; Duluth, Minn., mill $2 a ton over Pittsburgh, and Birmingham mill $3 a ton over Pittsburgh.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.55 to $2.60
Less carloads, Wheeling or Reading	2.70

Light Plates

No. 10, blue annealed, f.o.b. P'gh	2.00c. to 2.10c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.10c. to 2.20c.
No. 10, blue annealed, del'd Phila.	2.32c. to 2.42c.
No. 10, blue annealed, B'ham	2.25c. to 2.30c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh	2.15c. to 2.25c.
No. 13, f.o.b. Chicago dist.	2.25c. to 2.35c.
No. 13, del'd Philadelphia	2.47c. to 2.57c.
No. 13, blue annealed, B'ham	2.40c. to 2.45c.

Continuous Mill Sheets

No. 10 gage, f.o.b. P'gh	1.80c. to 1.90c.
No. 13 gage, f.o.b. P'gh	1.95c. to 2.05c.

(Usual range 24 in. to 48 in. wide)

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.55c. to 2.65c.
No. 24, f.o.b. Chicago dist. mill	2.65c. to 2.75c.
No. 24, del'd Philadelphia	2.97c.
No. 24, f.o.b. Birmingham	2.80c.

Steel Furniture Sheets

No. 24, f.o.b. P'gh	3.90c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.30c.
No. 24, f.o.b. Chicago dist. mill	3.40c.
No. 24, del'd Cleveland	3.49c.
No. 24, del'd Philadelphia	3.62c.
No. 24, f.o.b. Birmingham	3.45c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.80c. to 2.90c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	3.80c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	3.80c. to 3.90c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary	5.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per Package, 20 x 28 in.)

8-lb. coating I.C. $10.70 25-lb. coating I.C. $15.90
15-lb. coating I.C. 13.40 30-lb. coating I.C. 16.80
20-lb. coating I.C. 14.60 40-lb. coating I.C. 18.80

Alloy Steel Bars

(F.o.b. makers mill)

Alloy Quantity Bar Base, 2.65c. per Lb.

S.A.E. Series Numbers	Alloy Differential
2000 (1¼% Nickel)	$0.25
2100 (1¼% Nickel)	0.55
2300 (3½% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	0.20
6100 Chromium Vanadium Bars	1.20
6100 Chromium Vanadium Spring Steel	0.95
9250 Silicon Manganese Spring Steel (flats)	0.25
Rounds and squares	0.50
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ½ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plate, steel	2.07½
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Steel Black	Steel Galv.	Iron Inches	Iron Black	Iron Galv.
⅛	47	21½	¼ and ⅜	+11	+36
¼ to ⅜	53	27½	½	23	6
½	58	44½	¾	28	11
¾	62	50½	1 and 1¼	31	15
1 to 3	64	52½	1½ and 2	35	18

Lap Weld

2	57	45½	2	23	9
2½ to 6	61	49½	2½ to 3½	28	13
7 and 8	58	45½	4 to 6	30	17
9 and 10	56	43½	7 and 8	29	16
11 and 12	55	42½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	43	26½	¼ and ⅜	+13	+48
¼ to ⅜	49	32½	½	23	7
½	55	44½	¾	28	12
¾	60	49¼	1 to 2	34	18
1 to 1½	62	51½			
2 to 3	63	52½			

Lap Weld, extra strong, plain ends

2	55	44½	2	29	13
2½ to 4	59	48½	2½ to 4	34	20
4½ to 6	58	47½	4½ to 6	33	19
7 to 8	54	41½	7 and 8	31	17
9 and 10	47	34½	9 to 12	21	8
11 and 12	46	33½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—3¾ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	61	3 in.	46
1¼ to 1½ in.	53	3¼ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gages take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30% base (carloads)	55
Carbon, 0.30% to 0.40% base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

levels, although new buying is restricted on account of the unfavorable price situation in merchant wire products. Producers have been able to hold the price on bright hard wire at 2.40c., Pittsburgh, in most cases, although pressure for lower quotations is severe in some instances. The general market on nails in this district has declined to $2.20, Pittsburgh, to large jobbers, with $2.30 applying to the trade. Other merchant wire products reflect this decrease. In one or two cases jobbers claim to have had quotations of $2.15 or better, but these prices are now thought to have been withdrawn. Demand for nails is light and as jobbers' stocks are ample, the market is listless.

Sheets.—Specifications were heavier last week, and increased interest in future requirements is in evidence in some quarters. At least one large automobile maker will increase its tonnage in May, and, if prospective steel requirements are a criterion, the automobile industry as a whole is likely to make a good showing next month. Metal lath makers are still taking tonnage in fair volume, and barrel and drum manufacturers are running well. In the last week or two demand for galvanized sheets and roofing material has improved. The farm implement industry is still a heavy user of sheets, but mills in this district do not benefit as much from this business as those in the Chicago area. The larger sheet makers nearly all report a fairly well diversified demand and are agreed that the restricted buying of the automobile industry is the only thing which prevents a satisfactory operation. Mill schedules in this and nearby districts are holding at about 70 per cent of capacity, with a few makers of special finishes and other quality material maintaining a better rate.

Prices have not changed materially, although concessions of $2 a ton on light plates and blue annealed sheets seem to be more common. Larger producers continue to quote 2.10c., Pittsburgh, on light plates and 2.25c., on blue annealed sheets and some business is being taken regularly at these figures. Black sheets are quotable at 2.55c. to 2.65c., Pittsburgh, the lower figure applying largely on tonnage taking profitable extras. Galvanized material is unchanged at 3.30c., although a few large jobbers are getting concessions of $1 a ton. Not all mills are granting this. Metal furniture sheets are in good demand and the price is being held at 3.90c., Pittsburgh.

Tin Plate.—With the larger container manufacturers well supplied both with tin plate and finished cans, tin mill schedules are on a hand-to-mouth basis, even though operations are holding at recent high levels. Canning companies are hesitant at this season on account of crop uncertainty, but no adverse reports are heard and acreage this year is said to be slightly ahead of that of 1929.

Strip Steel.—Specifications are still running ahead of March and mill operations continue to reflect slight improvement. Nearly all the tonnage being received is for immediate rolling and shipment and schedules planned at the beginning of the week must often be increased before the end of the period. Considerable strip steel is going to pipe and tubing manufacturers, although the automotive industry is still the principal outlet. A number of these companies are now inquiring for their May requirements, which represent improvement over April in most instances. Hot strip mills in the district are running at 60 to 70 per cent of capacity and cold-rolling units at about 40 per cent. Prices on both hot and cold-rolled material are holding at recent levels.

Cold-Finished Steel Bars and Shafting.—Business continues to reflect slight improvement, and shipments this month are running considerably ahead of those of March. The rather firm price structure is a favorable factor in the market, as cold-finished bars are holding at 2.10c., Pittsburgh, and ground shafting at 2.45c. to 3.40c., according to size.

Coal and Coke.—Furnace coke is quiet, and prices are weak enough to cause producers serious concern. Spot sales are still being made at $2.60, Connellsville, but concessions have appeared on distress tonnage. Foundry coke is also weak and shipments are very light for this season. The coal market is listless, but is expected to gain strength with the opening of Lake navigation. Slack is scarce, and recent advances in prices are still effective.

Old Material.—Scrap prices have again declined, following the reported purchase of a substantial tonnage of No. 1 heavy melting steel by one mill in the district at $16 or less. Another consumer bought hydraulic compressed sheets. Some dealers are now offering only $15.25 for heavy melting steel on old contracts. and material is readily available at $15.50. Compressed sheets, on the other hand, are rather tight, and the opening of Lake navigation has curbed the flow of automotive material into this district. Prices in Detroit have also remained high enough seriously to hinder movement into Pittsburgh at present buying levels. Distress steel from a recent railroad list has recently been offered in this district at low prices with a disturbing effect on the market.

The failure of steel ingot production to show any substantial improvement is another bearish factor, and, while it may have seemed a few weeks ago that scrap would not go under $16, that figure does not now seem to be the bottom of the present movement. Machine shop turnings have been sold in the last week at $11.50, but other grades are quiet and demand is light.

Mills in the district do not seem disposed to buy scrap, and, while present quotations seem very low from the dealers' standpoint, mills, with reduced operating schedules, are inclined to place a low value on old material.

Warehouse Prices, f.o.b. Pittsburgh

	*Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.90c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.60c.
Galv. sheets (No. 24), 25 or more bundles	4.25c.
Light plates, blue annealed (No. 10), 1 to 24 plates	3.20c.
Blue annealed sheets (No. 13)	3.25c.
Galv. corrug. sheets (No. 28), per square	4.13c.
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black, soft ann'l'd, base per 100 lb.	$2.75 to 2.85
Wire, galv. soft, base per 100 lb.	3.20 to 3.30
Common wire nails, per keg	2.60 to 2.75
Cement coated nails, per keg	2.65 to 2.80

*On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 3999 lb.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$15.50 to $16.00
No. 2 heavy melting steel	13.50 to 14.00
Scrap rails	14.50 to 15.00
Compressed sheet steel	15.50 to 15.75
Bundled sheets, sides and ends	13.50 to 14.00
Cast iron carwheels	14.00 to 14.50
Sheet bar crops, ordinary	17.00 to 17.50
Heavy breakable cast	11.50 to 12.00
No. 2 railroad wrought	15.50 to 16.00
Hvy. steel axle turnings	14.00 to 14.50
Machine shop turnings	11.00 to 11.50
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	19.50 to 20.00
Railr. coil and leaf springs	19.50 to 20.00
Rolled steel wheels	19.50 to 20.00
Low phos. billet and bloom ends	21.50 to 22.50
Low phos. mill plates	20.50 to 21.50
Low phos. light grades	20.50 to 21.50
Low phos. sheet bar crops	21.00 to 22.00
Heavy steel axle turnings	14.00 to 14.50
Electric Furnace Grades:	
Low phos. punchings	19.50 to 20.00
Hvy. steel axle turnings	14.00 to 14.50
Blast Furnace Grades:	
Short shoveling steel turnings	10.50 to 11.00
Short mixed borings and turnings	10.50 to 11.00
Cast iron borings	10.50 to 11.00
Rolling Mill Grades:	
Steel car axles	20.50 to 21.50
Cupola Grades:	
No. 1 cast	14.00 to 15.00
Rails 3 ft. and under	18.50 to 19.00

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10-in. Pittsburgh	$33.00
Rerolling, 4-in. and under 10-in., Youngstown	33.00
Rerolling, 4-in. and under 10-in., Cleveland	33.00
Rerolling, 4-in. and under 10-in., Chicago	34.00
Forging quality, Pittsburgh	38.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$33.00
Youngstown	33.00
Cleveland	33.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$33.00
Youngstown	33.00
Cleveland	33.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$38.00
Cleveland	38.00
Chicago	39.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	12.00c.
Iron ore, low phos., Swedish, average 68% iron	12.00c.
Iron ore, basic Swedish, average 65% iron	10.00c.
Manganese ore, washed 52% manganese, from the Caucasus	30.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	30.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$14.00 to $16.50

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.60
Foundry, f.o.b. Connellsville prompt	$3.50 to 4.75
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-products, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	90c. to 1.10
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.25

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$94.00 to $99.00
Foreign, 80%, Atlantic or Gulf port, duty paid	94.00 to 99.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

Per Gross Ton Furnace		Per Gross Ton Furnace	
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
6%	$22.00 to $23.00	10%	$26.00 to $28.00
7%	23.00 to 24.00	11%	28.00 to 30.00
8%	24.00 to 25.00	12%	30.00 to 32.00
9%	25.00 to 26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd	$1.40 to 1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.00 to 18.50
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

Per 1000 f.o.b. Works	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh	75, 20, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, P'gh	75, 20, 10, 5 and 2½
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(⅞-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85 and 10
Upset hex. cap screws, S.A.E. thread	85 and 10
Upset set screws	80, 10 and 5
Milled studs	70

CHICAGO — Orders for Structural Materials Growing, Offsetting Slight Recessions Elsewhere

CHICAGO, April 22.—Changes this week in the Chicago iron and steel market appear to be of minor importance. Recessions in demand in some directions are offset by a slow broadening of steel use for other purposes. Shipments of sheets for outdoor work are rapidly tapering, but this may be only temporary because of the unusually wet weather prevailing over much of the Central West.

Orders being placed at mills for structural materials are growing, especially from territory surrounding Chicago. Revision downward in sheet production is accompanied by less stability in prices and correspondingly greater caution on the part of consumers when making commitments. Ingot capacity at mills making sheets is slightly lower, but the output of heavy tonnage products appears to have taken up the slack, so that ingot capacity now engaged is still close to 95 per cent.

The Illinois Steel Co., which last week lighted No. 5 furnace at South Works, expecting to take No. 1 stack out for relining, is finding that it can use additional pig iron, and now plans to hold No. 1 furnace in blast at least to the end of the month.

New sales of finished steel products are scattered, but in aggregate volume are not far from normal for this time of the year. Current specifications for most products are fully equal to shipments. As gaged by steel already shipped in April and schedules now arranged for the next six weeks, there is a growing feeling in the trade that the second quarter tonnage will not fall far short of total shipments in the first quarter of this year.

Pig Iron.—With one merchant stack being relined, the production of Northern foundry iron now about balances shipments. This is in contrast with the situation a week ago, when furnace stocks were slowly receding. This indicates that the melt is smaller than a week ago. However, shipping schedules show that deliveries in April will be comfortably ahead of the total in March. Users generally are showing more caution than earlier in the year, but their view of the future is not discouraging. The carry-over from first quarter contracts at $20 a ton is nearing an end, and melters are eagerly looking forward to the expiration of those commitments and the benefits which will accrue from the present quotation of $19.50. A user at Joliet has taken a small tonnage of Southern iron at $13 a gross ton, Birmingham.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$19.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.00
Malleable, not over 2.25 sil	19.50
High phosphorus	19.50
Lake Super. charc'l, sil. 1.50	27.04
S'th'n No. 2 fdy	$18.20 to 19.01
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	$28.79 to 29.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—This market is quiet in new sales. Specifications are spotty and in moderate volume.

Sheets.—Shipments of sheets are off rather sharply, following a decline in the needs of the roofing trade. The thought is expressed by some that this is a temporary situation brought about by wet weather, which is holding back outdoor work. Specifications from the manufacturing trade are steady, but conservative.

The change in the needs of buyers has resulted in lower operations at hot mills, which now are producing in the range of 70 to 75 per cent of capacity, with schedules which seldom can be planned for more than four to five days. Roofing sheets can be had from stock and other grades are being delivered promptly.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.70c. to 2.80c.; No. 24 galv., 3.45c.; No. 10 blue ann'l'd, 2.25c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Rails and Track Supplies.—With the greater part of buyers' needs covered, new purchases of standard-section rails are lacking in this market. Specifications for track supplies are liberal, but new orders are light. The light rail market is dormant.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.07½c. to 2.15c.; angle bars, 2.75c.

Cast Iron Pipe. — Outstanding among transactions this week is the placing of 2214 tons by Milwaukee with the United States Pipe & Foundry Co. The bid on plain end, Class C Pipe, sizes 36 to 48 in., was $40.40 a ton, delivered Milwaukee, or $31.90 a ton, Birmingham. The delivered price for the lugged pipe was $50.40. Ninety-seven tons of special fittings were taken at $135 a ton.

The McWane Cast Iron Pipe Co. will furnish 16,000 ft. of 4 and 6-in. pipe for Clio, Mich., and the National Cast Iron Pipe Co. will ship about 24,000 ft. of 4 to 8-in. pipe to Genoa, Ohio. Akron, Ohio, has placed 1500 tons, the light weight pipe having been taken by the American Cast Iron Pipe Co. and the Class C pipe by James B. Clow & Sons. Public utility companies continue to draw steadily against contracts, but the needs of railroads are light for this time of the year.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, $45.20 to $46.20; 4-in., $48.20 to $49.20; Class A and gas pipe, $3 extra.

Plates.—The outlook for use of steel plates by oil producers and refiners is unusually good, and some in the trade anticipate that 1930 will prove to be one of the best years on record in consumption of pipe for gas and oil lines. It is reported from Dallas, Tex., that the Lone Star Gas Co. is prepared to construct a 900-mile gas line from the Texas Panhandle to cities in Nebraska and Iowa. Shipments of plates to the Milwaukee pipe maker are in heavy tonnage.

New orders for plates for oil storage tank construction are small and widely scattered. However, much work of this character is in contemplation and bids that already have been taken call for not less than 20,000 tons.

Western car shops continue to hold to a satisfactory rate of output, and are consistent users of round tonnages of steel. The Northern Pacific has placed an order for 250 stock cars, and it is reported that the Illinois Central is receiving bids on the 2300 units which it contemplates purchasing. The Western plate market is in a very satisfactory condition. Deliveries, though somewhat extended on sheared plates, are still satisfactory, and prices are fairly well established at 1.90c. a lb., Chicago, with oc-

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel—	
Under 5 tons	2.85c.
5 tons to 30 tons	2.45c.
30 tons and over	2.00c.
Rail steel reinforcement	1.75c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (¼ in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.60c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, ⅜ in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	$2.85 to 2.95
Cement c't'd nails, base per keg	2.85 to 2.95

casional small mixed lots bringing 1.95c. and even 2c.

Hot Rolled Strips.—Quotations on this commodity are off $1 a ton. Hot strips wider than 6 in. are priced at 1.80c. to 1.90c. a lb., while strips 6 in. and narrower are quoted at 1.90c. to 2c. Local mills are rather comfortably occupied, though backlogs are light.

Structural Material.—Added promise is given to this market by inquiries which total close to 15,000 tons. The largest single inquiry is for 7000 tons for miscellaneous bridge work for the Santa Fe, which last week asked for prices on a similar tonnage for a bridge across the Illinois River. It is unofficially reported here that the Northwestern Mutual Life Building at Milwaukee, which will require 6600 tons, has been awarded and that only the formality of signing contracts is needed to close the deal.

Bids are being taken on the first of the World's Fair buildings. It is the general impression that bids will not be taken for other units until near the end of the year. Headway is being made on the Chicago traction problem, which, when settled, will pave the way for subway construction and a large use of steel.

Bars.—The character of the bar market is unusual for the reason that spot buying is more widespread than is customary at this time of the year. Most users are hesitant to make commitments for the future and they do not want tonnages coming to them faster than the bars can be converted into marketable commodities. Releases of mild steel bars are in larger aggregate volume than a week ago.

Alloy bar mills continue to produce at 70 per cent of capacity. Specifications from parts and automobile manufacturers have grown somewhat, but not in sufficient volume to be reflected in the rate of rolling. Prices for alloy steel bars are steady. Deliveries are prompt.

Demand for iron bars is spotty and mills lack orders for satisfactory operations. Prices are fairly well established at 1.90c. to 2c. a lb., Chicago.

Specifications for rail steel bars are lighter, following a week or 10 days during which there was a promise of revival of interest in this commodity. New buying at 1.80c. a lb., local mills, is spotty and in extremely small lots for immediate shipment.

Wire Products.—Demand for wire and wire products remains practically stationary. Specifications from the manufacturing trade have grown a trifle in the past week, but jobbers are taking smaller quantities, which is not unusual at this time of the year when farmers are busily engaged in the field and have little time to devote to other kinds of work. Shipments of nails, though still seasonably dull, show some improvement.

It is still too early for the effect of the drop in price of copper to be felt in the copper wire market. However, producers anticipate that the lower price will stimulate sales and also cause some users to release tonnages in anticipation of future needs.

Cold Rolled Strips.—Shipping instructions are a trifle heavier, but operations remain in the range of 35 to 40 per cent of capacity. Prices are steady.

Recessions in demand in some products offset by increases in others.

* * *

Ingot output remains at close to 95 per cent of capacity.

* * *

Sales of finished steel not far from normal for this time of year.

* * *

Shipments of sheets off sharply as wet weather interferes with outdoor work.

* * *

Much work in prospect in gas and oil lines and oil storage tank construction.

Reinforcing Bars.—New contracts in desirable tonnages are still few and far apart. Small awards, while showing some improvement, do not reach an aggregate tonnage comparable with the weekly average a year ago. Fresh inquiries are less numerous, and some projects, which several weeks ago seemed on the verge of going ahead, are now blocked by financial tangles. Probably the most active source of business at this time is with contractors who are signing for State road work. One lot of 300 tons will be purchased for Illinois highway bridges. The advance in shop operations noted a week ago has been checked by the sparsity of new work. Present quotations appear to be gaining strength.

Warehouse Business.—Prices for mild steel bars at Milwaukee warehouses have been reduced from 3.10c. a lb. to 3c. Quotations on plates and shapes remain steady at 3.10c. Sales from Chicago warehouses are in moderate volume, but uniformly steady.

Coke.—Current shipments and those scheduled over the next few weeks indicate a steady melt of iron in this district. The price of by-product foundry coke is $8 a ton, f.o.b. local ovens.

Bolts, Nuts and Rivets.—Production of these commodities remains steady at 60 per cent of capacity, which is approximately the current rate of shipments. Farm implement manufacturers and builders of road machinery are specifying large quantities, and some slight improvement is noted in use by automobile manufacturers. Discounts are unchanged.

Old Material.—The Western scrap market has changed little in the past week. Several small purchases of heavy melting steel have been made by mills at $13.50 a gross ton, delivered. Incoming tonnages appear to be ample to meet the needs of consumers. Bids by dealers or brokers are often above what is now the market level.

A characteristic of this market is the unwillingness of melters to take scrap faster than it can be used. This is resulting in hand-to-mouth buying of the strictest kind, extreme pressure when scrap is needed and hold-up orders when scrap cannot be used immediately. Prices for the malleable grades are lower as demand falters.

The Burlington will sell 4000 tons, and the Nickel Plate is offering 1200 tons.

Prices deliv'd Chicago district consumers.

Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel	$13.00 to $13.50
Shoveling steel	13.00 to 13.50
Frogs, switches and guards, cut apart, and misc. rails	13.75 to 14.25
Hydraul. compressed sheets	11.75 to 12.25
Drop forge flashings	9.75 to 10.25
No. 1 busheling	11.00 to 11.50
Forg'd cast and r'l'd steel carwheels	15.50 to 16.00
Railroad tires, charg. box size	16.50 to 17.00
Railroad leaf springs cut apart	17.00 to 17.50
Acid Open-Hearth Grades:	
Steel couplers and knuckles	15.25 to 15.75
Coil springs	17.50 to 18.00
Electric Furnace Grades:	
Axle turnings	12.00 to 12.50
Low phos. punchings	14.00 to 14.50
Low phos. plates, 12 in. and under	14.00 to 14.50
Blast Furnace Grades:	
Axle turnings	10.50 to 11.00
Cast iron borings	9.25 to 9.75
Short shoveling turnings	9.25 to 9.75
Machine shop turnings	7.50 to 8.00
Rolling Mill Grades:	
Iron rails	14.00 to 14.50
Rerolling rails	15.00 to 15.50
Cupola Grades:	
Steel rails, less than 3 ft.	16.00 to 16.50
Steel rails, less than 2 ft.	16.50 to 17.00
Angle bars, steel	15.00 to 15.50
Cast iron carwheels	14.50 to 15.00
Malleable Grades:	
Railroad	16.50 to 17.00
Agricultural	15.00 to 15.50
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angle and splice bars	14.00 to 14.50
Iron arch bars and transoms	16.00 to 16.50
Iron car axles	25.00 to 25.50
Steel car axles	16.00 to 16.50
No. 1 railroad wrought	11.75 to 12.25
No. 2 railroad wrought	11.50 to 12.00
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.25 to 7.75
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	8.50 to 9.00
Cupola Grades:	
No. 1 machinery cast	13.50 to 14.00
No. 1 railroad cast	12.75 to 13.25
No. 1 agricultural cast	11.00 to 11.50
Stove plate	10.00 to 10.50
Grate bars	10.25 to 10.75
Brake shoes	10.00 to 10.50

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

NEW YORK

Pig Iron Buying at Steady Rate—Steel Business Not Gaining

NEW YORK, April 22.—Pig iron buying moves along steadily at a moderate pace. Sales, at 10,000 tons, compare with 9000 tons in the preceding week and 12,000 tons two weeks ago. The Thatcher Co. closed for 2000 tons, the Eastern Malleable Iron Co. for 2500 tons and the Worthington Pump & Machinery Corporation for 600 tons. No large inquiries are now definitely before the trade, but the outlook is for a continuation of buying at about the rate that has prevailed for several months past, with most melters purchasing in moderate lots for early shipment and others occasionally ordering more generously because of the low prices now current.

With Buffalo foundry iron selling at $16 to $16.50, base furnace, eastern Pennsylvania iron at $18 to $18.50, and Alabama iron at $12.50, Birmingham, the market is believed to be scraping bottom. Dutch and Indian irons continue to be bought along the seaboard for mixture purposes, the latter selling at $20 and up, duty paid, port of entry.

One important seller reports that shipments thus far in April are heavier than in the corresponding period last month and are about on a par with those for the similar period in April, 1929. The experience of most selling houses, however, is that shipments are holding their own but are not improving. Foundry melt is still highly spotty, but on the average shows little change.

The New York State Barge Canal is now open to traffic and, while a number of boats have already moved to Buffalo, no iron cargoes have yet started this way.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$20.91 to $21.41
*Buff. No. 2, del'd east. N. J.	19.28 to 19.78
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	19.39 to 21.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	19.89 to 21.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Reinforcing Bars. — Lettings are light. Considerable work is pending, but contractors are slow to place the steel, possibly because of sharp price competition.

Concrete bars in 40, 50 and 60-ft. lengths for mill shipment are quoted at 1.85c. a lb., Pittsburgh. Warehouse prices range from 2.44c. a lb., f.o.b. cars New York, for carloads or larger lots to 3.25c. for the smallest tonnages.

Finished Steel.—Demand for finished steel products is fairly steady, but reflects no gains in activity among steel consuming industries. Railroads are buying very little. The price situation is virtually unchanged, with structural shapes at 1.94½c. to 2.04½c., New York, the low price applying only to large buyers and the top price to small buyers, while plates range from 1.97½c. to 2.07½c., New York, but only a few special buyers are able to get the minimum quotation. Galvanized sheets are being sold to some jobbers at 3.25c., Pittsburgh, though 3.30c. is still the quotation to consumers. Blue annealed sheets are weak.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.14c. to 2.19c.; plates, 2.02½c. to 2.07½c.; structural shapes, 1.94½c. to 2.04½c.

Cast Iron Pipe.—Although makers of pressure pipe are not booking large individual tonnages, there is a steady flow of small business, so that foundries are fairly well engaged. Prices are being maintained at $37 to $38 a ton, f.o.b. Northern foundry. The Department of Purchase, New York, will open bids April 25, on about 500 tons of water pipe, and the Department of Water Supply, Gas and Electricity, New York, is asking general contractors' bids for laying 20-in. pipe under Coney Island Creek. Morristown, N. J., is asking for bids on a sewage disposal plant which will require about 300 tons of cast iron pipe and accessories. Phelps, N. Y., opens bids April 29, on 700 tons of 6 to 12-in. pipe.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $39.90 to $40.90; 4-in. and 5-in., $42.90 to $43.90; 3-in., $49.90 to $50.90. Class A and gas pipe, $3 extra.

Warehouse Business. — Purchases from stock continue limited to small lots of material. Demand for structural material is unusually small for this season, but prices are fairly well maintained. Black sheets are moderately active and quotations range from 3.80c. to 4c. a lb., base. Competition among jobbers for galvanized sheet business is keen and 4.25c., base, is occasionally shaded slightly. Such sales, however, are not representative of the market on galvanized sheets, as the seller seldom has a range of gages available.

Coke. — Standard furnace grade continues at $2.50 to $2.60 a net ton, Connellsville, with sales in this district limited to occasional carloads for prompt shipment.

Special brands of beehive foundry coke, $4.85 a net ton, ovens, or $8.56 delivered to northern New Jersey, Jersey City and Newark, and $9.44 to New York and Brooklyn. By-product foundry coke is quoted at $9 to $9.40, Newark or Jersey City; $10.06, New York or Brooklyn.

Old Material.—A substantial part of the tonnage of No. 1 heavy melting steel moving from the New York district is being shipped by barge to consumers in Bridgeport, Conn., and Buffalo. For this shipment, brokers are paying $11 to $11.25 a ton, f.o.b. barges in the Gowanus Canal, Brooklyn, or in the Harlem River, while $10 a ton, New York, is the maximum offered for No. 1 heavy melting steel for shipment to eastern Pennsylvania. No. 2 heavy melting steel is moving to a Buffalo user by barge at $8.75 a ton, New York, and brokers buying this grade for delivery to western Pennsylvania are offering $8.45 to $8.70 a ton, New York. Other grades are quiet, with prices unchanged.

Dealers buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$10.00 to $11.25
Heavy melting steel (yard)	7.25 to 7.50
No. 1 hvy. breakable cast	8.75 to 9.75
Stove plate (steel works)	7.50 to 8.00
Locomotive grate bars	7.50 to 8.00
Machine shop turnings	6.50 to 7.00
Short shoveling turnings	7.00 to 7.25
Cast borings (blast fur. or steel works)	7.00
Mixed borings and turnings	6.00 to 6.50
Steel car axles	17.00
Iron car axles	20.00 to 20.50
Iron and steel pipe (1 in. dia., not under 2 ft. long)	9.25
Forge fire	8.50 to 9.00
No. 1 railroad wrought	11.75
No. 1 yard wrought, long	10.75
Rails for rolling	10.25 to 10.75
Stove plate (foundry)	8.50 to 9.00
Malleable cast (railroad)	11.50 to 12.00
Cast borings (chemical)	9.00 to 9.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast	$15.00
No. 1 hvy. cast (columns, bldg. materials, etc.); cupola size	13.00
No. 2 cast (radiators, cast boilers, etc.)	12.50

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-roll. strip, soft and quarter hard	5.05c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.60c.
Black sheets (No. 24*)	3.80c. to 4.00c.
Galvanized sheets (No. 24*)	4.25c. to 4.50c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, ½ x ½ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¾ in. and larger	3.75c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

	Per Cent Off List
Machine bolts, cut threads:	
¾ x 6 in. and smaller	60
1 x 30 in and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10

	Per 100 Ft.
Boiler Tubes—	
Lap welded, 2-in.	$19.00
Seamless steel, 2-in.	20.25
Charcoal iron, 2-in.	26.25
Charcoal iron, 4-in.	67.00

Tin Plate (14 *x* 20 *in.*)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

PHILADELPHIA

Automotive Plants More Active—Basic Iron and Scrap Decline

PHILADELPHIA, April 22.—Although steel mills have sufficient tonnage on their books to maintain fair operations, prices still lack firmness. Orders are individually small, consumers buying material only as actual operations require it. Manufacturers in the automotive field continue slightly more active than others, but have not yet appeared as large buyers. One of the largest steel tonnages pending in this market, about 600 miles of pipe for the Sun Oil Co., has been temporarily postponed. Fabricated steel business is improving in the number of new projects, but tonnages required are small.

Pig Iron.—Foundry iron buying from eastern Pennsylvania furnaces is limited to small lots, the more substantial orders going to Birmingham producers. Certain eastern Pennsylvania consumers, especially in the automotive field, are beginning to inquire for iron on the basis of expected increases in operations. A motor builder at Williamsport, Pa., has been increasing its output and a manufacturer in Philadelphia, which has been developing a new hydraulic shock absorber for motor cars, has been obtaining pig iron quotations in expectation of shortly entering into production of about 4000 sets a day. The Baldwin Locomotive Works, Eddystone, Pa., is inquiring for 1500 to 2000 tons of cylinder iron. A tonnage of basic iron has been closed in the past week, one consumer buying upward of 5000 tons and another a slightly smaller total. On the basis of these sales, the basic iron market is quotable at $18.75 to $19 a ton, delivered.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$20.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.76
East. Pa. No. 1X	21.26
Basic (del'd east. Pa.)	$18.75 to 19.00
Malleable	21.25
Stand. low phos. (f.o.b. east. Pa. furnace)	24.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.00 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	22.29
Va. No. 2X, 2.25 to 2.75 sil.	22.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Bars.—Purchases seldom exceed a carload and are usually smaller. On small lots for prompt shipment 1.85c., Pittsburgh, or 2.17c., Philadelphia, is usually quoted, while on lots of a carload or more the market is 1.80c., Pittsburgh, or 2.12c., delivered Philadelphia.

Reinforcing Bars.—Most current projects call for 15 to 50 tons of bars, a number combining reinforced concrete and structural steel construction. The billet steel bars price continues at 1.85c., Pittsburgh, with the extra for cutting to length usually omitted. Rail steel bars range from 1.70c. to 1.75c., Franklin, Pa., and Tonawanda, N. Y., or 2.02c. to 2.07c., delivered Philadelphia, with no extra for cutting to length or bending.

Shapes.—Small fabricators are obtaining increased business, as most of the construction in this district is in projects requiring small tonnages. Schools occupy a prominent place in building projects, with high schools to be constructed at Lansdale, Royersford and Hellertown, Pa., a shop building and grade school at Swarthmore, Pa., and a State normal school at Trenton, N. J. Shape prices lack firmness, and range from 1.75c. to 1.80c., f.o.b. nearest mill to consumer, or 1.81c. to 1.86c., delivered Philadelphia. Occasionally, on miscellaneous specifications, 1.85c., f.o.b. mill, is quoted, and on large desirable business slight concessions are granted from 1.75c., f.o.b. mill.

Plates.—The price of plates continues at 1.85c., Coatesville, Pa., or 1.95c., delivered Philadelphia. While concessions from this price are still granted occasionally on sizable tonnages, or when a plate order is combined with shapes, it is also true that 1.90c., Coatesville, Pa., is often paid by the buyer of less than a carload lot of plates, on which prompt delivery is specified.

Sheets.—Prices lack firmness, with mills competing keenly for the small volume of sheet business being offered. Consumers in the automobile field continue to buy sheets, but their purchases are limited to small lots. Although blue annealed sheets are still quoted at 2.25c., Pittsburgh, for No. 13 gage and blue annealed plates at 2.10c., Pittsburgh, for No. 10 gage, on recent business these prices have applied only to small lots for prompt shipment. Orders from automobile manufacturers, even though small, have developed concessions of $2 a ton to 2.15c. per lb., Pittsburgh, or 2.47c., Philadelphia, for No. 13 gage, and 2c., Pittsburgh, or 2.32c., delivered Philadelphia, for No. 10 gage. Most business in black sheets is at 2.60c., base Pittsburgh, or 2.92c., delivered Philadelphia, with 2.55c., base, used when adding extras for high-finished sheets. Galvanized sheets continue at 3.30c., Pittsburgh, or 3.92c., delivered Philadelphia, although there are reports of $1 concessions from this price having been granted in other districts.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Reinforc. steel bars, sq., twisted and deform	2.60c. to 2.80c.
Cold-fin.. steel, rounds and hex	3.40c.
Cold-fin. steel, sq. and flats	3.90c.
Steel hoops	3.55c.
Steel bands, No. 12 to ⅛-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.80c.
†Galvanized sheets (No. 24)	4.45c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates, ¼-in.	5.30c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Imports.—In the week ended April 19, 6900 tons of iron ore was received at this port from Algeria, and 2396 tons of pig iron from British India. Steel arrivals consisted of 74 tons of steel bars and 38 tons of structural shapes from Belgium.

Old Material.—A small tonnage of No. 1 heavy melting steel has been bought at $13.75 a ton, delivered by a Claymont, Del., consumer, and a sizable tonnage of this grade has been offered to a Steelton, Pa., mill at $13.50 a ton, delivered. No. 2 heavy melting steel is off 50c. a ton, following purchase of a small lot at $11.50 a ton, delivered Pencoyd, Pa., and yard grade of heavy melting steel has been bought by a Phoenixville, Pa., user at $10.50 a ton, delivered. Specification pipe and heavy breakable cast show reductions of 50c. a ton on the basis of recent orders. Forge fire lacks strength, and dealers are offering to contract at $12.50 to $13 a ton, delivered.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$13.75 to $14.00
No. 2 heavy melting steel	11.50 to 12.00
Heavy melting steel (yard)	10.50 to 11.00
No. 1 railroad wrought	15.00 to 15.50
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	12.75 to 13.00
Hydraulic compressed, old	11.25 to 11.75
Machine shop turnings (for steel works)	10.50
Heavy axle turnings (or equiv.)	12.50 to 13.00
Cast borings (for steel works and roll. mill)	11.00
Heavy breakable cast (for steel works)	13.00 to 13.50
Railroad grate bars	11.00
Stove plate (for steel works)	10.50 to 11.00
No. 1 low phos., hvy., 0.04% and under	20.50 to 21.50
Couplers and knuckles	20.00 to 20.50
Rolled steel wheels	19.50 to 20.00
No. 1 blast f'nace scrap	10.00 to 10.50
Wrot. iron and soft steel pipes and tubes (new specific.)	13.50
Shafting	18.00 to 18.50
Steel axles	21.00 to 21.50
No. 1 forge fire	12.50 to 13.00
Cast iron carwheels	15.00
No. 1 cast	15.00 to 15.50
Cast borings (for chem. plant)	13.50 to 14.00
Steel rails for rolling	15.00 to 15.50

CLEVELAND

Moderate Gains in Steel Orders, Chiefly from Motor Car Industry

CLEVELAND, April 22.—The volume of steel business showed a further slight gain during the week, principally in steel bars, structural shapes, sheets and hot-rolled strips. The ingot production by Cleveland mills was increased this week by the starting of an additional open-hearth furnace, and Cleveland steel plants are now operating 30 furnaces or 88 per cent of capacity, a gain of three points for the week.

While demand from the automotive industry is expanding, the increase appears to be due wholly to heavier production schedules by the Ford and Chevrolet companies.

The Ford Motor Co. has asked stamping plants in this territory to quote prices on fenders and running boards involving a large tonnage of sheets. The Ford company has made these in its own plant, and the inquiry indicates that the company intends to extend still further the number of car parts it has manufactured in outside plants. The Buick Motor Co. is expected to be in the market shortly for considerable tonnage of steel for its new models that are to come out during the summer.

The price situation shows little change. With the recent weakening of plates and shapes, the market on these products appears well established at 1.80c., Pittsburgh, for most business. There is still irregularity on some grades of sheets.

Iron Ore.—Sales are light and confined to small lots. Many consumers are carrying over considerable last year's ore in their stock piles and a few find it necessary to defer shipments until next year on purchases on long-term contracts under which they are obligated to take a specified tonnage each year. This will be an added obligation for 1931. The ore that is held up, if coming from open pit mines, will be left in the ground, but some that is to come from underground mines will be mined and put in stock piles.

The consumption of Lake Superior ore during March was 4,628,438 tons, a gain of 566,107 tons over February, according to the monthly report of the Lake Superior Iron Ore Association. This compares with 5,465,015 tons consumed in March last year. Ore at furnaces April 1 amounted to 19,785,012 tons, and the total at furnaces and Lake Erie docks on that date was 24,877,276 tons, as compared with 20,005,416 tons on the same date a year ago.

There were 164 furnaces using Lake ore in blast March 31, a gain of four for the month. Central district furnaces consumed 2,248,423 tons of Lake ore in March, a gain of 291,519 tons for the month. Lake front furnaces used 2,170,576 tons, an increase of 266,723 tons. All-rail furnaces used 99,882 tons, a gain of 8819 tons. Consumption by Eastern furnaces was 109,557 tons, a loss of 954 tons.

Pig Iron.—The market was quiet the past week. One producer sold 6000 tons, but not much business was taken by other furnaces. Inquiries are not numerous, the only one of any size being for 2500 tons of foundry iron from the Toledo territory. Furnaces that depend on the automotive industry for much of their business are maintaining an increase of about 15 per cent in shipments over March. However, in the northern Ohio territory the recent rate of foundry operations is not being maintained. Jobbing foundries continue to buy iron from hand to mouth.

The present lower delivered price of Southern foundry iron is being used by some consumers to attempt to force down prices on Northern grades. However, Southern iron is not a factor because apparently the only Alabama iron that is being sold in this territory is to foundries that still follow the policy of using Southern iron in their mixture.

Local furnaces are generally adhering to $18.50 for foundry and malleable iron, not attempting to take business in competitive consuming points where they would have to shade the price by absorbing some of the freight rate. For Cleveland delivery, $19, furnace, is maintained. Prices are unchanged in Michigan at $19.50 and in northern Indiana at $18.50 to $19.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$19.50
S'th'n fdy., sil. 1.75 to 2.25	19.51
Malleable	19.50
Ohio silvery, 8 per cent	28.00
Basic Valley furnace	18.50
Stand. low phos., Valley	$26.50 to 27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates; 50c. from local furnaces; $3 from Jackson, Ohio; $6.01 from Birmingham.

Bars, Plates and Shapes.—Steel bars and structural shapes are moving fairly well, the volume of business having gained slightly during the week. Plate business is still rather dull, although a more active demand has developed for small lots. Structural awards during the week included 3600 tons for two Akron buildings. Little new inquiry is coming out in the building field. Considerable tonnage for highway bridge work is still appearing in western New York and Pennsylvania. Prices are well stabilized at 1.80c., Pittsburgh, for plates and shapes for most consumers, although this is being shaded in some cases for large lots. A round tonnage for a Cleveland pipe line went at 1.75c. Steel bars are 1.80c., Cleveland, with apparently no deviation from this price. Some of the business in the Michigan territory is going to a Cleveland mill on that basis.

Sheets.—Orders show a slight increase. The Ford Motor Co. has sent out inquiries to stamping plants in this territory for automobile running boards and fenders. The production of each under the proposed schedule will require approximately 60 tons of sheets per day. Further increases in specifications have come from a local plant making Chevrolet body stampings, which is increasing its weekly output by 3000 units. Gain in orders is reported from electrical refrigerator manufacturers, and a fair amount of business is coming from washing machine manufacturers. There are some reports of concessions on blue annealed sheets, evidently due to competition between jobbing mills rather than attempts to meet continuous mill competition. Shading to 2.55c., Pittsburgh, on black sheets is still in evidence. Other prices are steady.

Wire Products.—While there is still some uncertainty as to nail prices, the ruling minimum quotation to jobbers is $2.20 a keg, and no shading of that price is reported in this territory. The price to retailers is $2.30. Manufacturers' wire, on which there has been occasional shading, now seems to be holding to 2.40c. Nail and wire business continues rather quiet.

Strip Steel.—Hot-rolled strip is moving slightly better than recently. Prices appear to be holding firmly at 1.70c., Pittsburgh, for wide and 1.80c. for narrow strip, at which most of the business is being taken, although some small-lot sales are still being made at $2 a ton higher. Demand for cold-rolled strip continues very light, and mills are badly in need of orders. This is commonly quoted at 2.55c., Cleveland, little being heard now of a 2.65c. price. Fender stock is being maintained at 3.90c.

Bolts and Nuts.—The industry is still feeling the effect of the restricted demand from the automotive industry, and orders from other consumers are not plentiful. Business this month shows only a slight gain over March. The industry is operating at about 65 per cent of capacity. While manufacturers generally are maintaining the 70 per cent discount, this discount is also being quoted by some of the larger jobbers.

Coke.—There is a considerable surplus of domestic coke now that the seasonal demand is practically over. The Ford Motor Co. will ship several cargoes of by-product coke to Duluth as soon as navigation opens. Foundry

coke is quiet and prices are unchanged.

Old Material.—Shipments to local mills continue slow, and there is no new demand from consumers. There is some activity in steel-making scrap for shipment to the Youngstown district, and dealers are paying $15.50 to $15.75 for No. 1 heavy melting steel and $11 for machine shop turnings, delivered Youngstown. Most prices are steady and show virtually no change, although orders are not of sufficient size to test the market.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:		
No. 1 heavy melting steel	$13.25 to	$13.75
No. 2 heavy melting steel	12.75 to	13.25
Compressed sheet steel	12.75 to	13.00
Light bundled sheet stampings	11.00 to	11.50
Drop forge flashings	11.00 to	11.50
Machine shop turnings	9.00 to	9.25
Short shoveling turnings	10.50 to	11.00
No. 1 railroad wrought	13.00 to	13.50
No. 2 railroad wrought	14.00 to	14.50
No. 1 busheling	12.00 to	12.50
Pipes and flues	9.00 to	9.50
Steel axle turnings	12.50 to	13.00
Acid Open-Hearth Grades:		
Low phos., forging crops	17.75 to	18.00
Low phos., billet bloom and slab crops	18.50 to	18.75
Low phos., sheet bar crops	18.00 to	18.50
Low phos., plate scrap	18.00 to	18.50
Blast Furnace Grades:		
Cast iron borings	10.00 to	10.50
Mixed borings and short turnings	10.00 to	10.50
No. 2 busheling	9.25 to	9.50
Cupola Grades:		
No. 1 cast	15.00 to	15.50
Railroad grate bars	11.00 to	12.00
Stove plate	12.00 to	12.50
Rails under 3 ft.	18.50 to	19.50
Miscellaneous:		
Rails for rolling	16.25 to	16.50
Railroad malleable	16.00 to	16.50

Detroit

Better Automobile Output Expected in May

DETROIT, April 22.—Demand for steel from the automobile industry has remained steady during the past two weeks. There are some indications that the motor car manufacturers will operate at slightly better rates in May than at present.

The Ford Motor Co. has shown a substantial gain in output, as reflected by orders placed with steel mills. Other manufacturers, including those in the low price class, are producing only a slightly larger volume of cars this month than in March.

Estimates are made here that the total automobile output for the second quarter will be 1,100,000 cars, or 2,100,000 for the first six months of the year, as compared with 3,500,000 in the same period last year.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$11.50 to	$12.00
Borings and short turnings	8.00 to	8.50
Long turnings	7.00 to	7.50
No. 1 machinery cast	11.50 to	12.00
Automotive cast	13.00 to	13.50
Hydraul. comp. sheets	11.25 to	11.75
Stove plate	9.00 to	9.50
New No. 1 busheling	10.50 to	11.00
Old No. 1 busheling	8.75 to	9.25
Sheet clippings	8.25 to	8.75
Flashings	10.00 to	10.50

BUFFALO

Pig Iron Demand Flattens Out but Foundries Report Better Business

BUFFALO, April 22.—The pig iron market has flattened out. No large inquiries are out, nor has any local furnace booked any sizable tonnage during the past week. Probably not more than 5000 tons in the aggregate was placed with all the furnaces in the district. Most of this business was in small lots. Two users in New Jersey which had inquiries out last week, one for 2000 tons and one for 1500 tons of foundry, are understood to have placed this business with furnaces in other districts. The Eastern Malleable Co. which required 2000 tons of malleable, is reported to have purchased a part of this from an eastern furnace. Several foundries report that business has improved considerably and they are beginning to look forward to a much better year than they expected a month ago.

Prices per gross ton f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$18.50
No. 2X fdy., sil. 2.25 to 2.75	19.00
No. 1 fdy., sil. 2.75 to 3.25	20.00
Malleable, sil. up to 2.25	19.00
Basic	17.50
Lake Superior charcoal	27.28

Finished Steel.—Operations of Buffalo mills are not quite so good as they were the week previous. The Lackawanna plant of the Bethlehem Steel Co. is operating 19 of 24 open-hearths; the Donner Steel Co. remains at four open-hearths. A Buffalo contractor has received the award for a new hotel at White Sulphur Springs, W. Va., which will require about 750 tons of structural steel and reinforcing bars.

Old Material.—The market is very quiet, probably more so than last week. A sale of stove plate is reported at $12 to a Buffalo consumer.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats and sq.	3.65c.
Rounds and hex.	3.15c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.20
Black wire, base per 100 lb.	3.50

Prices per gross ton f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:		
No. 1 heavy melting steel	$14.00 to	$15.00
No. 2 heavy melting scrap		12.50
Scrap rails	14.00 to	15.00
Hydraul. comp. sheets		12.50
Hand bundled sheets	10.00 to	10.50
Drop forge flashings		12.50
No. 1 busheling	13.00 to	13.75
Hvy. steel axle turnings	13.00 to	13.50
Machine shop turnings		8.00
No. 1 railroad wrought	10.50 to	11.00
Acid Open-Hearth Grades:		
Knuckles and couplers	17.00 to	17.50
Coil and leaf springs	17.00 to	17.50
Rolled steel wheels	17.00 to	17.50
Low phos. billet and bloom ends	17.50 to	18.00
Electric Furnace Grades:		
Short shov. steel turnings		11.75
Blast Furnace Grades:		
Short mixed borings and turnings	10.50 to	11.00
Cast iron borings	10.50 to	11.00
No. 2 busheling		8.00
Rolling Mill Grades:		
Steel car axles	16.50 to	17.00
Iron axles	19.50 to	20.00
Cupola Grades:		
No. 1 machinery cast	12.50 to	13.00
Stove plate	12.00 to	12.50
Locomotive grate bars	10.00 to	10.50
Steel rails, 3 ft. and under	17.00 to	17.50
Cast iron carwheels	11.50 to	12.00
Malleable Grades:		
Industrial	16.00 to	16.50
Railroad	16.00 to	16.50
Agricultural	16.00 to	16.50
Special Grades:		
Chemical borings	11.50 to	12.00

Residence Building Helped by Low Costs

"The most important single factor of recent development has been the increase in the supply and reduction in the cost of money available for residential building," says the executive committee of the National Building Survey Conference. "While this cannot be said to be the case in every community, it is true of most. It is likewise true that prices and terms for materials and equipment for such construction are as favorable now as they are likely to be for any coming period of months."

Members of the committee include: Chairman, Fenton B. Turck, vice-president, American Radiator & Standard Sanitary Corporation; A. C. Pearson, chairman of the board, United Business Publishers, Inc.; W. A. Starrett, president, Starrett Brothers, Inc.; Ernest A. Hale, president, United States Building and Loan League; Thomas S. Holden, vice-president, F. W. Dodge Corporation.

Western Metal Congress to Be Held in San Francisco

For the 1931 Western Metal Congress and Exposition to be held in San Francisco the week of Feb. 16, 1931, the following men have recently consented to head subcommittees: Howard S. Taylor, Leland Stanford University, is chairman of the program group; James V. Coulter, Earl M. Jorgenson Co., Oakland, leads the exhibit committee; John R. Gearhart, John R. Gearhart Co., Oakland, will arrange for plant inspections; entertainment will be planned by a committee serving under Harold E. Gray, Bethlehem Steel Co., San Francisco; registration and attendance will be handled respectively by George E. Batten and S. Craig Alexander, both of the Ludlum Steel Co.'s San Francisco office.

Ivan L. Johnson, Best Steel Casting Co., Oakland, is chairman of the general committee appointed by W. H. Eisenman, secretary of the American Society for Steel Treating.

PACIFIC COAST

Reinforcing Bar and Cast Pipe Awards Large

SAN FRANCISCO, April 19.—(*By Air Mail*).—Awards of reinforcing steel bars and cast iron pipe aggregated the largest weekly tonnage of the year, and a fair volume of plates and structural shapes also was placed. The price structure, with the exception of plates, is on a firm basis.

Pig Iron.—Movement of foundry pig iron is slow. Most users have fair-sized stocks. Quotations are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Finished Steel.—Demand for mild steel bars has shown little improvement during the past few weeks. Prices are firm at 2.35c., c.i.f. Reinforcing bar bookings totaled more than 2000 tons, and included 1000 tons for a pier and bulkhead at Pearl Harbor, Hawaii, and 170 tons for the Southern Pacific Hospital addition, San Francisco, both secured by the Pacific Coast Steel Corporation. The Truscon Steel Co. took 400 tons for a hospital in the Presidio, San Francisco, while the Northwest Steel Rolling Mills booked 400 tons for a store in Seattle. Out-of-stock prices in the San Francisco district continue unchanged at 2.30c., base, on carload lots.

Some improvement in demand for plates is noted, though prices are not firm at 2.20c., c.i.f. The Western Pipe & Steel Co. secured 3500 tons for two gas holders for the Southern Counties Gas Co., Los Angeles, and the Consolidated Steel Corporation took 500 tons for a gas tank for the same company at Santa Monica, Cal. The California-Hawaiian Sugar Co., Crockett, Cal., withdrew its inquiry for 1800 tons for a welded steel pipe line and purchased cast iron pipe instead.

Important structural lettings included 400 tons for a telephone building on Daly Street, Los Angeles, secured by McClintic-Marshall Co., and 460 tons for a shop building for the Naval Air Station at Sandpoint, Wash., taken by the Hofius Steel & Equipment Co. Shapes are firm at 2.35c., c.i.f.

Cast Iron Pipe.—The United States Pipe & Foundry Co. has just booked the largest tonnage of the year, calling for 6500 tons of 20-in. Class B pipe for the California-Hawaiian Sugar Co., Crockett, Cal. This company also secured 617 tons of 4 to 12-in. Class 150 pipe for Santa Ana, Cal. The American Cast Iron Pipe Co. took 100 tons of various sizes for Calgary, Alta., B. C. Edmonton, B. C., awarded 800 tons of 6 to 12-in. Class 150 pipe to an unnamed maker. The Pacific States Cast Iron Pipe Co. booked 350 tons of 4 to 8-in. Class 150 pipe for Sunnyside, Wash. Bids were opened this week on 530 tons of 4 to 12-in. Class B pipe for Renton, Wash., and on 500 tons for Wenatchee, Wash. The American Cast Iron Pipe Co. was low bidder on 161 tons of 4 to 8-in. Class 150 pipe for the Los Angeles County Water Works District No. 10.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	2.45c. to 2.95c.
Soft steel bars	2.40c. to 2.95c.
Black sheets (No. 24)	3.65c. to 4.30c.
Blue ann'l'd sheets (No. 10)	3.05c. to 3.55c.
Galv. sheets (No. 24)	4.30c. to 4.80c.
Struc. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

fabricators was 500 tons booked by the Ingalls Iron Works Co. for New Orleans. The aggregate of new business is still under the output.

Twenty open-hearths were active last week, one more than in the previous week. The Gulf States Steel Co. has rebuilt and placed in operation one furnace and has two others out for rebuilding. The capacity of the furnaces is being increased from 75 to 90 tons.

Cast Iron Pipe.—Demand has eased off some in the past week. Small orders are fairly numerous, but large ones are scarce. Charlotte, N. C., opened bids April 18, for about three miles of 30-in. pipe. Thibodaux, La., will open bids April 29 on 500 tons of small size pipe, and Vardman, Miss., will open bids May 6, on 12,500 ft. of 2-in. pipe. District plants are bidding on 4000 tons of 36-in. pipe for Detroit to be awarded today.

Plant operations are reported averaging slightly better than at this season last year. Operations at individual shops vary from 50 to 80 per cent capacity. Prices are unchanged from the base of $37 to $38, Birmingham.

Coke.—The Semet-Solvay Co. has placed 300 additional ovens in operation at its Ensley plant, making a total of 1231 ovens active and 159 idle.

Old Material.—Steel scrap is moving better. Large steel mills are doing most of the buying. Prices are unchanged.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$13.00 to $13.50
Scrap steel rails	14.00
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	11.50 to 12.00
Steel axles	22.00
Iron axles	23.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	15.50
No. 1 cast	13.00
Tramcar wheels	12.50
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem.	13.50 to 14.00

BIRMINGHAM

Pig Iron Sales Slower—Sheet Prices Reduced—Steel Volume Lower

BIRMINGHAM, April 22.—Pig iron shipments and sales are slower than 10 days ago, and are averaging below those of last month. Inquiries are few and involve small tonnages. Most of the large consumers are covered for the quarter. The base price of $14 for district sales is unchanged.

Seventeen furnaces are active, the same as in the past several weeks. Of this number, nine are on foundry iron, six on basic, one on recarburizing iron and one on ferromanganese.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$14.00
No. 1 fdy., 2.25 to 2.75 sil.	14.50
Basic	14.00

Finished Steel.—Mills have made another reduction in sheet prices to bring them more in line with prices in other territories. Quotations on blue annealed sheets have been reduced $1 a ton, making the minimum quotations 2.25c. for Nos. 9 and 10 and 2.40c. for No. 13. Black sheets have been reduced from 2.90c. to 2.80c. Sales of galvanized sheets made a good gain last week, despite the fact that the market is in the midst of the season that is usually the quietest of the year. Tank plates, bars and shapes are averaging fairly well, but the volume is not as heavy as last month, and backlogs are being cut down by the continued heavy mill operations.

The only outstanding order reported last week by structural steel

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	4.90c.
Structural rivets	4.15c.
Boiler rivets	4.15c.

	Per Cent Off List
Tank rivets, ⅞-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

CINCINNATI

Pig Iron Sales 4,200 Tons—Sheet Mill Operations 65 Per Cent

CINCINNATI, April 22.—District furnace representatives report sales of about 4200 tons of pig iron in the past week, of which 500 tons was silvery. Southern pig iron is especially dull. Shipments against current contracts are going forward at a good rate. Three central Ohio melters took 300 tons of Northern foundry iron each, and two central Indiana buyers entered the market for 700 tons and 300 tons respectively, while a third Indiana melter took 200 tons of Southern pig iron. A Michigan melter bought 400 tons of silvery.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.25	16.69 to 17.69
Ala. fdy., sil. 2.25 to 2.75	17.19 to 18.19
Tenn. fdy., sil. 1.75 to 2.25	17.19 to 17.69
S'th'n Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—Demand for sheets in this district has settled to a rate of about 65 per cent, with operations of sheet mills on a parity with the demand. The specialty demand, especially from the so-called luxury manufacturers, is very backward. Buyers are very conservative in their purchases.

Old Material.—With mills operating on curtailed schedules and new business almost negligible, the scrap market is weak. Yard accumulations are being held to a minimum, as dealers fear to be caught long. Prices have receded from 25c. to 50c. on a number of items.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.30c.
Rail steel reinforc. bars	3.15c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	4.20c.
Small rivets	60 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg (25 kegs or more)	2.95
Cement c't'd nails, base 100 lb. keg	2.95
Chain, per 100 lb.	10.25
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in.	$16.50
4-in.	34.50
Seamless steel boiler tubes, 2-in.	17.50
4-in.	36.00

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$11.50 to $12.00
Scrap rails for melting	13.00 to 13.50
Loose sheet clippings	8.00 to 8.50
Bundled sheets	10.75 to 11.25
Cast iron borings	8.00 to 8.50
Machine shop turnings	7.75 to 8.25
No. 1 busheling	9.75 to 10.25
No. 2 busheling	6.25 to 6.75
Rails for rolling	13.00 to 13.50
No. 1 locomotive tires	14.00 to 14.50
No. 2 railroad wrought	11.50 to 12.00
Short rails	17.75 to 18.25
Cast iron carwheels	12.00 to 12.50
No. 1 machinery cast	18.50 to 19.00
No. 1 railroad cast	15.00 to 15.50
Burnt cast	9.50 to 10.00
Stove plate	9.50 to 10.00
Brake shoes	9.50 to 10.00
Agricultural malleable	14.00 to 14.50
Railroad malleable	15.00 to 15.50

That company also was awarded 900 tons of reinforcing bars for the Herbert Hadley Vocational School.

Old Material.—The scrap market is dull and prices are weak. While buying by consumers is light, railroad shipments have been heavy and the movement from country yards freer. However, there is said to be no distress material. Selected and No. 1 heavy melting steel grades, miscellaneous standard section rails, railroad springs and No. 2 railroad wrought are 25c. off, while steel car axles, steel rails, less than 3 ft. steel angle bars and No. 1 railroad malleable are 50c. lower. Wrought iron bars and transoms have been cut $1.50, and No. 1 machinery cast $1.

Railroad lists: Chicago, Burlington & Quincy, 3640 tons; Chicago & Alton, 1960 tons; Chicago, Milwaukee, St. Paul & Pacific, 1050 tons; and Chicago Great Western, 18 carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

Selected heavy melting steel	$12.75 to $13.25
No. 1 heavy melting or shoveling steel	11.75 to 12.25
No. 2 heavy melting or shoveling steel	11.00 to 11.50
No. 1 locomotive tires	14.50 to 15.00
Misc. stand-sec. rails including frogs, switches and guards, cut apart	12.50 to 13.00
Railroad springs	15.00 to 15.25
Bundled sheets	8.50 to 9.00
No. 2 railroad wrought	11.75 to 12.25
No. 1 busheling	9.75 to 10.25
Cast iron borings and shoveling turnings	9.25 to 9.75
Iron rails	13.00 to 13.50
Rails for rolling	14.00 to 14.50
Machine shop turnings	6.75 to 7.25
Heavy turnings	9.00 to 9.50
Steel car axles	17.00 to 17.50
Iron car axles	25.50 to 26.00
Wrot. iron bars and trans.	18.00 to 18.50
No. 1 railroad wrought	10.50 to 11.00
Steel rails, less than 3 ft.	15.00 to 15.50
Steel angle bars	12.00 to 12.50
Cast iron carwheels	13.50 to 14.00
No. 1 machinery cast	14.00 to 14.50
Railroad malleable	13.50 to 14.00
No. 1 railroad cast	13.00 to 13.50
Stove plate	10.50 to 11.00
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails 70 lb. and over	26.50 to 29.00
Agricult. malleable	12.50 to 13.00

ST. LOUIS

Sea Wall in Texas Takes 2400 Tons of Bars —Pig Iron and Scrap Dull

ST. LOUIS, April 22.—Sales of pig iron during the last week amounted to about 3000 tons. The St. Louis Gas & Coke Corporation sold 1800 tons, all foundry iron, in scattered lots, the largest of which was 500 tons to an equipment builder in the district. A leading Southern maker sold approximately 1000 tons.

Consumption by stove foundries, which has slowed down some because of an accumulation of finished stock in warehouses, is expected to pick up again as soon as mail order houses and other large buyers specify shipments. The stove interests look for a heavy business during the last half of the year.

The market is steady, with prices unchanged.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.50
Malleable, f.o.b. Granite City	20.00
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	$17.42 to 18.42
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Steel.—New business in plates, shapes and bars is being received in fair volume, while schedules against contracts are being well maintained. Buying by railroads is light. Warehouse business is about 12 per cent less than at this time last year, and yet conditions here are said to be better than in centers which depend upon the automobile trade. Business with the oil fields is quiet.

With the construction trade here showing little activity, factors are looking elsewhere for business, the Laclede Steel Co. having got the award of 2400 tons of reinforcing bars for a sea wall at Port Arthur, Tex.

Superior Steel to Roll Rustless Strip Steel

The Superior Steel Corporation, Grant Building, Pittsburgh, is installing three four-high cold rolling mills at its plant at Carnegie, Pa., for production of rust-resisting strip steel as rolled from the semi-finished product of the Rustless Iron Corporation of America, Baltimore. The mills may also be used for the production of ordinary cold-rolled strip steel. In announcing the installation of these mills, Frank R. Frost, president of the Superior corporation, stated that in its future mill installations the company will endeavor to secure equipment which can be used interchangeably in the production of rust-resisting and ordinary strip steel.

Concrete Steel Co. is moving its New York offices this week to 2 Park Avenue.

BOSTON

Cast Iron Sales Upward of 12,000 Tons—New Low Prices on Scrap

BOSTON, April 22.—A company inquiring for 2000 tons of pig iron, half for its New Britain, Conn., plant and half for Troy, N. Y., is reported to have placed 600 tons with an Eastern furnace for New Britain and an equal amount with a Buffalo stack for Troy at a delivered price just under $21 a ton. It is intimated the company will buy a substantial tonnage in May. Other sales reported for the week totaled 7000 tons. The Mystic Iron Works' sales amounted to nearly 6000 tons, all for New England delivery, and were surprisingly large in view of the fact that a week ago it was considered New England foundries were well covered up to June 1.

Foundry iron prices per gross ton deliv'd to most New England Points:

†Buffalo, sil. 1.75 to 2.25	$20.28 to $21.28
†Buffalo, sil. 2.25 to 2.75	20.78 to 21.78
*Buffalo, sil. 1.75 to 2.25	20.91 to 21.91
*Buffalo, sil. 2.25 to 2.75	21.41 to 22.41
Va., sil. 1.75 to 2.25	25.21
Va., sil. 2.25 to 2.75	25.71
*Ala., sil. 1.75 to 2.25	22.61
*Ala., sil. 2.25 to 2.75	23.11
†Ala., sil. 1.75 to 2.25	18.75
†Ala., sil. 2.25 to 2.75	19.25

Freight rates: $4.91 all rail and $4.28 rail and water from Buffalo; $5.21 all rail from Virginia; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.

*All rail rate.

†Rail and water rate.

Reinforcing Bars.—Lettings of rail steel bars reported the past week exceeded 2000 tons, and included 1500 tons for road work at Bennington, and four other Vermont State jobs, 326 tons for road work at Taunton, Mass., and 166 tons at West Springfield, and several smaller jobs. The market for rail steel bars is generally 2.26½c., base, delivered Boston freight rate points, but that price has been cut depending on the desirability of tonnage involved. Quotations made openly on billet steel bars are: 1 to 5-ton lots, 3.06½c. a lb., base, from stock; 5 to 99 tons, 2.66½c.; 100-ton and larger lots, 2.56½c.

Old Material.—New low prices for 1930 were established the past week on most grades of scrap. As prices fall, offerings dry up, consequently the market is quiet. A Worcester, Mass., mill is still buying No. 1 heavy melting steel and long bundled skeleton, but in much smaller quantities than a month ago. Pittsburgh district steel mills apparently are securing all the scrap desired in New York and States further south and west of New England, but eastern Pennsylvania mills continue to take limited tonnages here.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$9.00 to $9.50
Scrap T rails	9.00 to 9.50
Scrap girder rails	8.25 to 8.75
No. 1 railroad wrought	10.00 to 10.50
Machine shop turnings	5.00 to 5.60
Cast iron borings (steel works and rolling mill)	5.00 to 6.00
Bundled skeleton, long	8.00 to 8.50
Forge flashings	8.00 to 8.50
Blast furnace borings and turnings	5.00 to 5.50
Forge scrap	7.50 to 8.50
Shafting	13.50 to 14.50
Steel car axles	16.00 to 17.00
Wrought pipe, 1 in. in diameter (over 2 ft. long)	8.50 to 9.00
Rails for rolling	10.50 to 11.00
Cast iron borings, chemical	8.50 to 9.00

Prices per gross ton deliv'd consumers' yards:

Textile cast	$12.00 to $13.50
No. 1 machinery cast	14.50 to 15.25
No. 2 machinery cast	14.00 to 14.50
Stove plate	10.50 to 11.00
Railroad malleable	16.00 to 16.50

Cast Iron Pipe.—Sales of pipe reported the past week aggregated more than 12,000 tons, and included upward of 5000 tons placed privately, of which 2000 tons was gas pipe for a municipality. Holyoke, Mass., placed 1500 tons of 6 to 24-in. pipe, and Cumberland, R. I., 700 tons of 8-in. with R. D. Wood & Co.; and Brookline, Mass., 300 tons of 6 to 12-in. with the Donaldson Iron Co., while sales reported by the Warren Foundry & Pipe Co., included 300 tons of 6, 8 and 10-in. to Watertown, Mass., 100 tons of 4-in. gas pipe to Middleboro, Mass., 125 tons of 6 to 14-in. water pipe to Everett, Mass., and 125 tons of 6 and 8-in. to Marlboro, Mass. Worcester, Mass., placed 1500 tons of 6 to 24-in., and Andover and Cambridge, Mass., 100 tons each, but names of sellers are withheld. For 600 tons of 16-in. pipe required by Winthrop, Mass., foreign pipe makers were the low bidders and the Warren Foundry & Pipe Co. the low American bidder. No award has been made.

Whitman, Mass., has not awarded 100 tons of 6-in., bids for which are closed. On April 28, Peterboro, N. H., closes bids on six miles of 6, 8 and 10-in. pipe, which will be purchased through a contractor, and Peabody, Mass., is to close on 300 tons of 6 to 12-in. Hudson, Mass., is in the market for 1925 ft. of 12-in. pipe. Domestic pipe prices are unchanged at $37 to $38 a ton, base, f.o.b. foundry for 6-in. and larger dimensions.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring Steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Canada

Pig Iron Sales Are at Slower Pace

TORONTO, April 22.—Pig iron sales in the week were about 1000 tons, which was one of the smallest weekly totals this year. The slump is looked upon as only a temporary let up, and local blast furnace representatives expect improved business within a week or 10 days. Shipments against contracts are going forward on schedule, and the movement of foundry and malleable iron is well sustained. Prices are firm.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$22.60
No. 2 fdy., sil. 1.75 to 2.25	22.10
Malleable	22.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$24.00
No. 2 fdy., sil. 1.75 to 2.25	23.50
Malleable	24.00
Basic	22.50
Imported Iron, Montreal Warehouse	
Summerlee	$33.50
Carron	33.00

Old Material.—Steel scrap had a small call during the week, and sales of iron scrap were confined to a few special grades. Prices are unchanged.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	$9.00	$8.00
Rails, scrap	11.00	9.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	6.50
Heavy axle turnings	7.50	6.50
Cast borings	6.50	5.00
Steel borings	6.50	6.00
Wrought pipe	6.00	6.00
Steel axles	14.00	17.00
Axles, wrought iron	16.00	19.00
No. 1 machinery cast	....	16.00
Stove plate	....	12.00
Standard carwheels	....	14.50
Malleable	....	13.00
Per Net Ton		
No. 1 mach'ry cast	$15.00	....
Stove plate	11.00	....
Standard carwheels	14.00	....
Malleable scrap	11.00	....

River Shipments of Steel Gained in March

Shipments of steel products on the Ohio River in the Pittsburgh district totaled 109,911 tons during March, as compared with 74,385 tons in February and 92,040 tons in March, 1929. These figures are compiled by the United States Engineer Office, Pittsburgh. On the Monongahela River, March steel shipments amounted to 111,702 tons, as against 80,327 tons in the preceding month and 93,627 tons in March of last year. Only 100 tons of steel was moved on the Allegheny River last month, as compared to 210 tons in February, and 25 tons in March, 1929.

Non-Ferrous Metal Markets

Copper More Active—Tin Dull—Lead Quiet—Zinc Lowest Since 1922

NEW YORK, April 22.

Copper.—Since the drop in price a week ago, foreign sales have been the feature. With 4100 tons sold this morning, the sales for the month to date total about 36,000 gross tons, which is larger than for January, February or March. The prospects are that the April total will be the largest since last fall. The Easter holidays abroad have interfered somewhat with foreign sales, and the closing of markets here on Good Friday and virtually on Saturday slowed down activity in the domestic market. Orders to fabricators are not coming in as rapidly as had been hoped for, and therefore domestic copper sales are not heavy.

It should be remembered also that the readjustment in prices for fabricated copper and brass products was not decided upon until yesterday, and this has had a deterrent effect. It is generally recognized that it will take a week or two to gage the effect of the lower copper prices, although sales have been moderately active since the reduction. On this page will be found the new prices for rolled copper and brass products which have been reduced 3c. to 4c. a lb.

All sorts of reports are abroad as to a further reduction in prices, but no further reduction is likely. Producers contend that the drastic reduction was intended as a minimum price from which to work upward rather than downward should demand warrant it. Electrolytic copper is quoted unchanged at 14c., delivered in the Connecticut Valley, with the price of Copper Exporters, Inc., at 14.30c., c.i.f. usual European ports. Moderate activity is reported by Lake copper producers, with the quotation at 14c. to 14.12½c., delivered.

Something of a shock was experienced this morning by a drop in standard copper at London of about £3 per ton. This was pointed to as purely speculative. It was remembered, however, that a week ago a reduction of £5 per ton at London preceded the 4c. reduction here.

Tin.—Consumers, who are apparently well covered, are remaining out of the market. A decline today in copper and lead at London has upset the tin market as well as other non-ferrous markets and has deferred any inclination there might be to purchase

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Apr. 22	Apr. 21	Apr. 19	Apr. 17	Apr. 16
Lake copper, New York	14.12½	14.12½	14.12½	14.12½	14.12½
Electrolytic copper, N. Y.*	13.75	13.75	13.75	13.75	13.75
Straits tin, spot, N. Y.	35.87½	36.37½	....	36.25	36.25
Zinc, East St. Louis	4.75	4.77½	4.77½	4.77½	4.82½
Zinc, New York	5.10	5.12½	5.12½	5.12½	5.17½
Lead, St. Louis	5.40	5.40	5.40	5.40	5.40
Lead, New York	5.50	5.50	5.50	5.50	5.50

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—
- High brass ..... 20.50c.
- Copper, hot rolled ..... 23.75c.
- Zinc ..... 10.00c.
- Lead (full sheets) ..... 8.25c.

Seamless Tubes—
- High brass ..... 25.50c.
- Copper ..... 26.00c.

Rods—
- High brass ..... 18.75c.
- Naval brass ..... 21.50c.

Wire—
- Copper ..... 15.50c.
- High brass ..... 21.00c.

Copper in Rolls ..... 22.75c.
Brazed Brass Tubing ..... 28.00c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 31.30c.
Tubes, base ..... 42.00c.
Rolled rods in coils ..... 31.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	20.50c.
Copper, hot rolled	26.00c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.75c.
Lead, wide	10.05c.
Seamless Tubes—	
Brass	25.50c.
Copper	26.00c.
Brass Rods	18.75c.
Brazed Brass Tubes	28.00c.

New York or Cleveland Warehouse

Delivered Prices, Base per Lb.

High brass	20.50c.
Copper, hot rolled, base sizes	23.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes	26.00c.
Seamless Tubes—	
Brass	25.50c.
Copper	26.00c.
Brass Rods	18.75c.
Brazed Brass Tubes	28.12½c.

New York Warehouse

Delivered Prices, Base per Lb.

Zinc sheets (No. 9), casks	10.25c. to 11.00c.
Zinc sheets, open	11.25c. to 11.75c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig	38.00c. to 39.00c.
Tin, bar	40.00c. to 41.00c.
Copper, Lake	15.50c.
Copper, electrolytic	15.25c.
Copper, casting	15.00c.
Zinc, slab	6.25c. to 7.25c.
Lead, American pig	6.50c. to 7.00c.
Lead, bar	8.00c. to 8.50c.
Antimony, Asiatic	10.25c. to 10.75c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy	24.00c. to 25.00c.
Babbitt metal, commercial grade	25.00c. to 35.00c.
Solder, ½ and ½	25.50c. to 26.50c.

Metals from Cleveland Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig	42.25c.
Tin, bar	44.25c.
Copper, Lake	15.50c.
Copper, electrolytic	15.25c.
Copper, casting	14.25c.
Zinc, slab	7.50c. to 7.75c.
Lead, American pig	6.38c. to 6.63c.
Lead, bar	8.75c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade	17.50c.
Babbitt metal, high grade	44.25c.
Solder, ½ and ½	27.75c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses. (Until the market settles, prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	11.50c.	12.50c.
Copper, hvy. and wire	11.25c.	12.25c.
Copper, light and bottoms	10.00c.	11.00c.
Brass, heavy	6.75c.	8.00c.
Brass, light	5.50c.	6.50c.
Hvy. machine composition	9.00c.	10.00c.
No. 1 yel. brass turnings	6.75c.	7.25c.
No. 1 red brass or compos. turnings	8.25c.	9.25c.
Lead, heavy	4.25c.	4.75c.
Lead, tea	3.00c.	3.50c.
Zinc	2.75c.	3.25c.
Sheet aluminum	9.50c.	11.50c.
Cast aluminum	8.50c.	10.50c.

tin. Stocks in warehouses in London last week increased 580 tons, bringing the total on Saturday, April 19, to 17,051 tons. This large increase, on top of one of 318 tons a week ago, makes the total for the two weeks very large. Prices in London today were about £2 per ton less than a week ago, with spot standard quoted at £162 2s. 6d., future standard at £164 10s., and spot Straits at £164 5s. The Singapore price today was £167. Spot Straits tin was quoted here today at 35.87½c., New York, in a very dull market.

Lead.—Conditions in this market are unchanged. Quotations are firm at 5.40c., St. Louis, with the contract price of the leading interest at 5.50c., New York. An unsettling factor is the failure of foreign producers to bring about the curtailment in output which had been expected. Most consumers are well covered and are holding aloof from the market so that sales are confined to carload and smaller lots.

Zinc.—A new low price for prime Western zinc since 1922 was registered today, when the quotation fell to 4.75c., East St. Louis. This is the lowest level since April 4, 1922, when the quotation was the same. Lack of demand is the principal cause. Lower prices have been offered by one or two producers for the little demand that is floating about. It is believed by some producers that the bottom of the market has been reached and that it will rebound, similar to the action a week or so ago when from a low of 4.80c. it advanced to 5c. An encouraging fact is the larger amount of inquiry.

Ore prices are unchanged at $35, Joplin. Sales last week were 11,010 tons. Production amounted to 8600 tons, with shipments at about 4140 tons. Stocks now stand at 20,963 tons, the largest since late in January.

Antimony.—In a dull market Chinese metal is quoted lower at 7.75c., New York, duty paid.

Nickel.—Ingot nickel in wholesale lots is quoted at 35c. a lb., with shot nickel at 36c. and electrolytic nickel in cathodes at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c., delivered, as the published price.

Non-Ferrous Metals at Chicago

CHICAGO, April 22.—The copper market is more active following lower prices announced a week ago. Sales of tin, lead and zinc are steady. The old metal market is steady with prices lower on the copper bearing grades.

Prices per lb., in carload lots: Lake copper, 14.50c.; tin, 37c.; lead, 5.50c.; zinc, 4.95c.; in less-than-carload lots, antimony, 8.60c. On old metals we quote copper wire, crucible shapes and copper clips, 12.25c.; copper bottoms, 9.25c.; red brass, 8.75c.; yellow brass, 6.25c.; lead pipe, 4.25c.; zinc, 2.50c.; pewter, No. 1, 19c.; tin-foil, 21c.; block tin, 26.50c.; aluminum, 9.25c.; all being dealers' prices for less-than-carload lots.

C. S. Eaton Elected Sheet & Tube Director

George C. Brainard and Hugh B. Wick, Eaton Supporters, Also Join Youngstown Board

CYRUS S. EATON, of Otis & Co., Cleveland bankers, who led the opposition to the merger of the Youngstown Sheet & Tube Co. with the Bethlehem Steel Corporation, was elected a member of the board of directors and a member of the executive committee of the Youngstown company at the annual meeting in Youngstown on Tuesday. Two other men who supported Mr. Eaton in his anti-merger fight were elected with him as directors. They are George C. Brainard, president, General Fireproofing Co., Youngstown, and Hugh B. Wick. With these two directors and himself, Mr. Eaton and associates are represented by four members on the Sheet & Tube board; S. Livingston Mather of Cleveland, who was put on the board last year as a representative of the Eaton interests, is the fourth.

It was voted to increase the number of the members of the board of directors from 11 to 12, thus making way for an additional Eaton representative, as only two directors resigned. They were Harris Creech, Cleveland banker, and C. H. Booth.

Following the Sheet & Tube annual meeting, Mr. Eaton issued a statement that additional suits will be filed this week to prevent consummation of the sale of the company to the Bethlehem Steel Corporation. These suits, Mr. Eaton said, will charge violation of the Ohio and Federal laws.

Reinforcing Steel

Awards of 9500 Tons — New Projects About 4000 Tons

LETTINGS of 9500 tons of reinforcing steel showed a substantial gain over those of the previous week. The largest award was 2400 tons for a sea wall at Port Arthur, Tex. State road work accounts for 3000 tons. New projects total about 4000 tons as against 1400 tons a week ago. Awards follow:

STATE OF VERMONT, 1500 tons, road work, 1150 tons to Northern Steel Co., 350 tons to Truscon Steel Co.

STATE OF MASSACHUSETTS, 492 tons, road work, to Northern Steel Co.

NEW YORK, 200 tons, Queensboro Bridge upper deck and viaduct, through Bersin-Romm Engineering Corporation, general contractor, to Capital Steel Corporation of New York.

NEW YORK, 350 tons, Gottfried Baking Co. plant, West Fifty-first Street, to Faitoute Iron & Steel Co.

WAUKEGAN, ILL., 150 tons, central station for Public Service Co. of Northern Illinois, to Calumet Steel Co.

CHICAGO, 100 tons, Film Exchange building, to Inland Steel Co.

CHICAGO, 150 tons, store and office building at Diversey and Milwaukee Avenues.

SPRINGFIELD, ILL., 1000 tons, State road work; bids to be opened May 7.

ST. LOUIS, 900 tons, Herbert S. Hadley Vocational School, to Laclede Steel Co.

KANSAS CITY, MO., 100 tons, St. John's Academy, to Construction Products Co., Kansas City.

PORT ARTHUR, TEX., 2400 tons, sea wall, to Laclede Steel Co.

SEATTLE, 400 tons, store, Second and Pike Streets, to Northwest Steel Rolling Mills.

SAN FRANCISCO, 400 tons, hospital at Presidio, to Truscon Steel Co.

SAN FRANCISCO, 170 tons, Southern Pacific Hospital, to Pacific Coast Steel Corporation.

CHICO, CAL., 129 tons, Teachers College, to Concrete Engineering Co.

PEARL HARBOR, 1000 tons, pier and bulkhead for Naval Air Station, to Pacific Coast Steel Corporation.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

BROOKLYN, 360 tons, subway section 5, route 110, Rockaway Avenue; general contract awarded to Silas Mason Co., Inc., New York.

EAST PITTSBURGH, PA., 1400 tons, Turtle Creek bridge; Booth & Flinn, Inc., general contractor.

ERIE COUNTY, PA., 210 tons, highway bridge on route 696.

CLEVELAND, 250 tons, service building for Western Reserve University.

SPRINGFIELD, ILL., 350 tons, State highway bridges.

CHESTER, ILL., 450 tons, addition to State Penitentiary.

CHICAGO, 100 tons, superstructure for Victor Lawson Y. M. C. A.

CHICAGO, 500 tons, Northwest service station for Commonwealth Edison Co.: revised figures being taken.

SEATTLE, 400 tons, Y. M. C. A. building; bids being taken.

SACRAMENTO, CAL., 123 tons, highway work in Humboldt County; bids May 7.

Railroad Equipment

Northern Pacific Orders 250 Stock Cars

RAILROAD equipment buying continues at low ebb. The week's orders included 250 stock cars for the Northern Pacific and a contract for the rebuilding of 500 hopper cars for the Virginian. Details follow:

Virginian Railway has awarded a contract to the Virginia Bridge & Iron Co. to rebuild 500 55-ton hopper cars.

Fruit Growers Express is in the market for 366 underframes.

Erie is inquiring for 150 75-ton ballast cars.

Illinois Central is taking prices on six 600-hp. oil electric engines.

Indianapolis Union Railway will buy four switching engines.

Northern Pacific has ordered 250 stock cars from Ryan Car Co.

Chicago & North Western is inquiring for 15 locomotives.

Fabricated Structural Steel

Awards of 30,000 Tons Gain Over Previous Week—New Projects Include 9460 Tons in New York Subway

STRUCTURAL steel awards of about 30,000 tons were only a little larger than the previous week's total of about 29,000 tons. Included were 6600 tons for a life insurance building in Milwaukee, 3500 tons of plates for two gas holders in California and 2300 tons in a new roadway on the Queensborough Bridge, New York.

New projects of about 34,000 tons were smaller than in the previous week. A new subway section in New York will take 9460 tons, a building for the *News* in Detroit 2500 tons, and transmission towers in Illinois 2325 tons. Awards follow:

STATE OF MAINE, 175 tons, highway bridge, to American Bridge Co.

NEW YORK, 2300 tons, upper roadway on Queensborough Bridge, to McClintic-Marshall Co.

NEW YORK, 400 tons, school No. 159 in Queens, to Easton Structural Steel Co.

NEW YORK, 2000 tons, addition to Bloomingdale store, to Hay Foundry & Iron Works.

BRENTWOOD, N. Y., 1500 tons, Pilgrim State Hospital, to Lehigh Structural Steel Co.

TROY, N. Y., 400 tons, building for Rensselaer Polytechnic Institute, to Lehigh Structural Steel Co.

DELAWARE, LACKAWANNA & WESTERN RAILROAD, 375 tons, bridges, to Shoemaker Bridge Co.

ERIE RAILROAD, 450 tons, bridge at Paterson, N. J., to American Bridge Co.

STATE OF NEW JERSEY, 650 tons, bridges for highway department, to McClintic-Marshall Co.

READING RAILROAD, 225 tons, freight station at Philadelphia, to Montgomery Iron & Steel Co.

PITTSBURGH, 1360 tons, addition to Duquesne Club, to McClintic-Marshall Co.

PITTSBURGH, 470 tons, Murphey store, to John Eichleay Co.

PITTSBURGH, 250 tons, fruit auction building for Pennsylvania Railroad, to McClintic-Marshall Co.

EAST LIVERPOOL, OHIO, 560 tons, manufacturing building for Hall Pottery Co., to McClintic-Marshall Co.

AKRON, OHIO, 2400 tons, Mayflower Hotel, to Berger Iron Works.

AKRON, 1200 tons, Y. M. C. A. building, to Berger Iron Works.

CLEVELAND, 120 tons, addition to Charity Hospital, to National Iron & Wire Co.

NEW ORLEANS, 500 tons, for city sewage and water board, to Ingalls Iron Works.

ATCHISON, TOPEKA & SANTA FE, 725 tons, bridge, to Capitol Iron Works, Topeka, Kan.

MANKATO, MINN., 175 tons, public building, to New City Iron Works, Chicago.

MILWAUKEE, 6600 tons, building for Northwestern Mutual Life Co., to an unnamed bidder.

MILWAUKEE, 500 tons, transmission towers for Milwaukee Electric Railway & Light Co., to Blaw-Knox Co.

RACINE, WIS., 560 tons, mechanical engineering building for University of Wisconsin, to McClintic-Marshall Co.

EDMONDS, WASH., 490 tons, plates, six tanks for Union Oil Co., to Seattle Boiler Works.

CAMAS, WASH., 130 tons, plates, smokestack for Crown-Willamette Paper Co., to Seattle Boiler Works.

SANDPOINT, WASH., 460 tons, shop building for Naval Air Station, to Hoflus Steel & Equipment Co.

LOS ANGELES, 400 tons, telephone building, to McClintic-Marshall Co.

LOS ANGELES, 3500 tons, plates, two gas holders for Southern Counties Gas Co., to Western Pipe & Steel Co.

SANTA MONICA, CAL., 500 tons, plates, gas tank for Southern Counties Gas Co., to Consolidated Steel Corporation.

STOCKTON, CAL., 180 tons, Kress Building, to Schraders Iron Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

LYNN, MASS., 200 tons, General Electric Co. auditorium.

BURLINGTON, VT., 172 tons, theater.

QUINCY, MASS., 112 tons, high school.

PLYMOUTH, MASS., 104 tons, Plymouth Cordage Co. boiler house.

PAWTUCKET, R. I., 200 tons, automobile garage for street railroad.

STATE OF NEW YORK, 500 tons, highway bridges, bids taken April 22.

NEW YORK, 300 tons, African hall for American Museum of Natural History.

NEW YORK, unstated tonnage, loft building at 149th Street and Third Avenue.

NEW YORK, 9460 tons, subway section, Section 6, route 108. Bids open April 29.

NEW YORK CENTRAL RAILROAD, 500 tons, bridges.

SCHENECTADY, N. Y., unstated tonnage, Y. M. C. A. building.

SYRACUSE, N. Y., 250 tons, highway bridge.

STATE OF NEW JERSEY, 1000 tons, highway bridges.

PHILADELPHIA, 100 tons, addition to University of Pennsylvania stadium.

TRENTON, N. J., 200 tons, main building, dormitories and boiler plant for State Teachers' College and Normal School.

NORRISTOWN, PA., 300 tons, theater for Norris Amusement Co.

PHILADELPHIA, 2500 tons, North Broad Street National Bank.

YOUNGSTOWN, 1500 tons, theater for Warner Brothers; general contract awarded to Heller Brothers.

DETROIT, 2500 tons, Detroit *News* building.

DETROIT, 1400 tons, pump house for Water Works Department.

GRAND RAPIDS, MICH., 500 to 1000 tons, auditorium.

KEWANEE, ILL., 2325 tons, transmission towers for Super Power Co. of Illinois.

CHICAGO, 400 tons, administration building for Chicago World's Fair; previously reported as tonnage being estimated.

ATCHISON, TOPEKA & SANTA FE, 7000 tons, bridge work for 1930.

RACINE, WIS., 125 tons, Post Office.

MILWAUKEE ROAD, 300 tons, bridges.

UNION PACIFIC, 200 tons, bridge work.

KANSAS CITY, MO., 3000 tons, office building for Bryant Estate; previously reported as 1300 tons.

MARIETTA, OKLA., 1000 tons, highway bridge over Red River.

LOS ANGELES, 100 tons, hangar No. 3; McClintic-Marshall Co., low bidder.

Tube Mill of Flexible Design

(*Concluded from page* 1227)

matically blows out the inside of the pipe by means of compressed air at 90 lb. pressure. The pipe is also "stripped" by means of compressed air as it passes through the blowing ring. The inclined conveyor is equipped with a throwout which discharges the clean, galvanized pipe on to a rack which deposits it in cradles from which it is handled in crane lifts.

Pipe to be enameled is dipped in a tank set in the ground, in which the enamel is completely circulated once every two to three hours, the temperature of the whole being closely controlled. Withdrawal from this tank, at the rate of 10 ft. in 30 min., allows ample time for the conduit to "strip" itself. Conduit is handled vertically into this tank in 4-ton lifts by racks carried on an overhead monorail system. After dipping, the conduit is held in drying ovens for 4 hr.

The 180-ft. central section has a 45-ft. leanto on each side. The west leanto houses shop offices and power plant; the east leanto the machine shop, steam plant and a pump to supply water for the testing machine. All pipe is tested at pressures of 800 to 1500 lb. per sq. in.

Other units at the Alton works are: three 80-ton and one 100-ton open-hearth furnaces; a 32-in. bloomer, an 18-in. billet and bar mill; a 10-in. four-high continuous hot strip mill and an 8-in. cross-country mill. In 1915 this plant had a monthly ingot capacity of 5000 tons; in 1925 of 12,500 tons. At present it can produce 22,000 tons a month.

March Non-Ferrous Ingot Deliveries

CHICAGO, April 21.—The combined deliveries of brass and bronze ingots and billets by the members of the Non-Ferrous Ingot Metal Institute for the month of March amounted to 6632 tons. In February they were 6898 tons and in January 6154 tons.

A second and enlarged edition of a dictionary of technical and shop terms used by the steel constructor has been issued by American Institute of Steel Construction, 200 Madison Avenue, New York, under the title "Fact Book." In addition to 20,000 such definitions, the book contains a directory of the trade and much statistical information.

Revamped Forging and Plating

(*Concluded from page* 1220)

veyor and pass over 13 tanks in a series of nearly vertical loops. As they move along the conveyor they are given successive immersions for cleaning, flash nickel plating, copper plating and final nickel plating. This automatic plating machine is similar in its mechanical handling features and arrangement to the automatic cleaning machine previously mentioned. A filtration plant is provided for filtering the nickel plating solution.

On leaving either of the nickel plating units the bars are put on a monorail trolley and taken to the nickel buffing machines. These are fitted with standard cotton buffs 18 in. in diameter and varying in thickness, depending on the bar. After buffing they are hung back on the same conveyor, which carries them to the chromium plating equipment.

Conveyor Inspection Has Advantages

While moving along this conveyor they are given 100 per cent inspection. This method of inspection is regarded as more efficient than were the inspectors to examine the bars in a pile on a table, for with the latter method of inspection it would be easy for an inspector at all careless to fail to give proper inspection to every piece.

After inspection the pieces plated in the manually operated nickel plating unit are hung back on the racks, on which they were carried through the plating process. Those plated in the automatic plating machine are hung on similar racks. On these they are carried through the chromium plating operations.

Before chromium plating the bars are given a series of operations which prepares them to receive the chromium. After plating they are rinsed and sprayed, and then go through a tank of hot water to dry the bars. The racks are handled in and out of the tanks by electric hoists.

Chromium Must Cover Nickeled Surface

A hot chromium-plating bath is used, the work being kept in the bath three minutes. A constant high current density is maintained. The total amperage draw on the generator is regulated by the number of square feet of work being placed in the bath. Leaving the plating bath and cleaning tanks, the bars are hung back on the monorail, which carries them to the inspection department.

As there is only a slight difference in color between nickel and chromium plating, careful inspection is necessary after plating to make sure that the chromium plating completely covers the nickel surface. Special daylight-type 100-watt lamps are used; some have screen covered reflectors to produce a diffused light, which shows the nickel rather clearly. Bars that are passive or not completely coated with chromium are removed for replating. Those which have a frosty chromium plating or water stains are removed and buffed. The remainder are hung back on the conveyor, which carries them to the assembly department.

Reaching the assembly room, parts for different models are placed in rows of storage bins at the side of the conveyor. Along the opposite side of these bins is an assembly bench and on a level with the bench a conveyor for carrying away the assembled units. There are two of these conveyors, one 150 ft. long and 20 in. wide having wooden flights and the other a canvas belt 100 ft. long and 20 in. wide. The assembly bench at the side of each conveyor is 12 in. wide. Assembled bumpers are inspected when reaching the end of the conveyor, and then packed for shipment.

Close laboratory control is kept over the plating department. All plating baths and operations are under laboratory supervision and additions to the baths, to keep the solutions up to standard at all times, are made at frequent intervals by men from the laboratory. Several bars are taken from each day's production and given the salt spray test, being left in the bath from 100 to 150 hours.

Electric heat with temperature control is provided in the glue room, where emery wheels are resurfaced. The glue is cooked in electric cookers and then put in electric warming pots, both the cookers and pots having thermostatic control. Proper drying temperature is maintained in the wheel storage room by thermostatic control.

Changes in Forging Practice

PLANT efficiency has been increased and labor reduced in the forging department by the installation recently of new equipment. An interesting method has been provided for handling pieces through furnaces for heating, in connection with the eye-forming operations. By this means hand labor in handling the pieces between the machines and furnaces has been reduced considerably. The bars are placed on a conveyor table 60 ft. long and 40 in. wide, moving at 8 in. a minute.

At each side of the table and close to it are gas-fired heating furnaces with a narrow opening extending across the front of the furnace, level with the conveyor. The bars are laid side by side on the conveyor, with one end extending over the side of the table. As it moves along the table the end passes through the fire, heating the end that is to be forged. As the furnace is 5 ft. wide, the piece under the time cycle is in the furnace 7½ min.

After heating, a machine operator lifts the piece from the conveyor, forms the eye on one end and places it back on the conveyor, the other end of the bar extending over the opposite side of the conveyor table. As the bar moves along the table this end is heated in another similar furnace, and then the eye is forged on an eye-forming machine located on that side of the table.

Two complete eye-forming units are provided, with the one conveyor, the work being fed on the conveyor at one end and at the middle. With this equipment not only is the usual practice of handling pieces in and out of the furnace by hand eliminated, but there is a uniform time of heating the piece.

The furnaces are set on casters, to permit changing their position in respect to the conveyor. When a long bar is being handled the furnaces are set a little farther away from the conveyor than when the shorter bars are being forged. As the unit is provided for production work, changes in the position of the furnaces are not frequent. With the eye-forming units 28,800 eyes are rolled in 9 hr.

Five Operations with One Heating

The speed of forming bars has been materially increased by the installation of five machines for forming arms, brackets and back bars for a type of rear bumper made on a large production basis. The five operations are performed so rapidly that no reheating of the stock is necessary.

These operations and the equipment used for performing them are: edge bending the straight bar on a standard bull-dozer, gang punching on a press, punching and trimming on a specially designed press, forming and punching on another press and flat bending (forming) on a bull-dozer. The final machine operation, flat forming the piece, is done on a hydraulically operated bull-dozer having a long stroke and high speed.

This machine, which is operated with a foot treadle, is said to have a possible speed of twenty 24-in. strokes a minute, but is being operated at six strokes a minute. The machine stands on a 20-deg. incline, so that the hot pieces have no tendency to tip or shift when laid in the dies. It exerts a 10-ton pressure and returns, eliminating, it is claimed, the possibility of breaking the machine or dies because of overloading or other causes. It is run by a motor-driven rotary oil pump delivering 25 gal. of oil a minute at 2000 lb. per sq. in. pressure. The pump is driven by a 10-hp. motor mounted on a stand over a tank holding 30 gal. of extra-heavy motor oil.

Continuous Furnace Used

The flat bars are heated to forging temperature in a continuous conveyor-type furnace. They are placed crossways on the conveyor and go through the furnace in sets of three. Leaving the furnace, they are put on a short gravity conveyor which carries them to the first machine. The five machines are operated by three men.

The work moves through the furnace and machine operations according to a predetermined time cycle. By the time the last bar is formed the first of the next set of three is delivered on the gravity conveyor. After the final forming operation the bars are quenched in oil in a specially designed conveyor-type tank, which delivers them to the drawing furnace.

Slackness Features European Markets

British Holidays Still Affecting Trade—French Output Slightly Lower—Cartel Quotas Have Been Exceeded

(*By cable*)

LONDON, ENGLAND, April 22.

IRON and steel markets are quiet after the holidays and little change is expected this week. Cleveland pig iron makers are looking for a revival of demand, but consumers are holding off, in anticipation of cheaper prices. Hematite is dull, with makers and merchants competing keenly to reduce large unsold stocks.

Finished steel is quiet, with works needing heavy steel orders, and working irregularly.

Tin plate makers will restart after the holiday with well-filled order books, but the mills generally are not resuming operations until the end of the week. Consumers recently have shown keen interest, and the general outlook is quite favorable. Galvanized sheets are idle. Black sheets are quiet.

Continental markets here are dull, awaiting final arrangements between merchants and the Continental steel cartel.

Thomas W. Ward, Ltd., Sheffield, which recently purchased the Denby Iron & Coal Co., Ltd., near Derby, has decided to dismantle the four Denby blast furnaces, which have total capacity of 1400 tons a week.

Cartel Control Office Opens

Plans Investigation of Low Steel Prices—European Steel Exchanges No Longer Important Factors

HAMBURG, GERMANY, April 7.—The central control office of the Continental Steel Cartel began operations in Brussels, Belgium, today. A sizable staff of officials and employees will be maintained and one of its first acts will be to investigate the source of low prices in European markets.

Establishment of subsidiary syndicates controlling prices of steel products under the Continental Steel Cartel has brought a decided decline in the volume of business transacted in the steel exchanges in Charleroi and Brussels, Belgium; Dortmund, Germany; Paris and London. Buyers of Continental steel have found that prices at the exchanges are no lower than the quotations obtainable from the steel syndicates or from exporters.

Until the end of last year the steel exchanges of Charleroi, Brussels and London determined the prices of most steel products. All steel companies and traders maintained agents at the exchanges and numerous buyers attended. Today, sheets and cold-rolled hoops are the only products traded at the exchanges in substantial volume.

Steel merchants in Continental markets, who have been exercised recently over the small amount of price protection that the cartel has been willing to grant them, have reached an agreement to fix their own prices. Competition among the jobbers had been keeping warehouse prices of steel at unprofitable levels and, since only a small differential was granted them as merchants by producers, they formed their own organization and at a recent meeting decided to establish regional prices for shipment from stock, based on the distance of consumers from the mills.

Cartel Members Have Exceeded Quotas

BERLIN, GERMANY, April 10.—The Continental Steel Cartel has retained a 10 per cent reduction of production quotas for the month of April. Production totals for members of the cartel show a general increase compared with a year ago, so that quotas are being exceeded. Steel output of all members was at the rate of 29,287,000 tons in the first quarter of last year, 31,287,000 tons in the second quarter and 32,287,000 tons in the third quarter. In the fourth quarter of the year the cartel applied the 10 per cent reduction to the total allotment, which is still retained.

German output of steel ingots in 1929 was 16,246,000 metric tons, compared with 14,517,000 tons in 1928; French production was 9,664,000 tons, compared with 9,368,000 tons; Belgian was 4,132,000 tons, compared with 3,934,000 tons; Luxemburg, 2,702,000 tons, compared with 2,567,000 tons, and Saar production, 2,209,000 tons, compared with 2,073,000 tons.

Among the obstacles to a renewal of the cartel in the fall is the fact that certain Belgian and Luxemburg mills have been selling at less than the minimum prices fixed by the car-

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at $4.8665 (par)

British Prices f.o.b. United Kingdom Ports

Ferromanganese, export	£10	15s.	to	£11	15s.	$52.30	to	$57.17
Billets, open-hearth	6	0	to	6	10	29.20	to	31.63
Black sheets, Japanese specifications	12	5				59.61		
Tin plate, per base box	0	18 1/3	to	0	18 1/2	4.46	to	4.50
						Cents a Lb.		
Steel bars, open-hearth	8	0	to	8	10	1.74	to	1.85
Beams, open-hearth	7	7 1/2	to	7	17 1/2	1.60	to	1.71
Channels, open-hearth	7	12 1/2	to	8	12 1/2	1.66	to	1.87
Angles, open-hearth	7	7 1/2	to	7	17 1/2	1.60	to	1.71
Black sheets, No. 24 gage	9	15	to	10	0	2.12	to	2.17
Galvanized sheets, No. 24 gage	11	17 1/2	to	12	5	2.57	to	2.60

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	£3	3 1/2s.	to	£3	4 1/2s.	$15.44	to	$15.69
Billets, Thomas	4	13	to	4	14	22.63	to	22.87
Wire rods, low C., No. 5 B.W.G.	6	2	to	6	4	29.69	to	30.19
Rails, light	6	0				29.20		
Black sheets, No. 31 gage, Japanese	11	5	to	12	12	54.68	to	58.32
						Cents a Lb.		
Steel bars, merchant	5	7 1/2				1.18		
Steel bars, deformed	5	6 1/2	to	5	7 1/2	1.17	to	1.18
Beams, Thomas, British standard	5	3	to	5	6	1.12	to	1.17
Channels, Thomas, American sections	5	12	to	5	14	1.24	to	1.26
Angles, Thomas, 4-in. and larger, over 5/16-in. thick	5	6				1.17		
Angles, Thomas, 3-in.	5	7 1/2				1.18		
Hoop and strip steel over 6-in. base	5	17 1/2				1.28		
Wire, plain, No. 8 gage	6	9				1.41		
Wire, barbed, 4-pt. No. 12 B.W.G.	10	10				2.28		
Wire nails, base	6	12 1/2				$1.44 a keg		

tel last November. Semi-finished steel and bars have been sold at concessions of 2s. to 4s. (48c. to 96c.) a ton. Neither Belgium nor Luxemburg consumes more than 10 to 15 per cent of its production.

United Steel Works Reports Decline in Business

DUSSELDORF, GERMANY, April 10.—The report of the United Steel Works for the first half of its business year, October, 1929, to March, 1930, inclusive, shows a substantial increase in production, compared with the first half of the business year 1928-1929. Coal output totaled 14,030,340 metric tons, compared with 12,867,610 tons in the first half of 1928-1929; pig iron production was 3,135,393 tons, compared with 2,608,345, and steel ingot output was 3,270,410 tons, compared with 2,841,694 in the first half of the previous year.

The increased output is accounted for by the lockout in the steel industry in November, 1928. Production from January to March of this year was considerably smaller than in the same period of 1929, and both domestic and export sales were smaller than in the previous three months. Unfilled orders on March 31 were 68.7 per cent of their value at the end of the business year 1928-1929. The number of workers employed by the corporation on March 31, was 169,336.

German Works Plans Large Blast Furnace

WASHINGTON, April 24.—Construction of a 1200-ton blast furnace is about to be started by the August Thyssen Steel Works, subsidiary of the United Steel Works, Düsseldorf, Germany, according to a report received by the Department of Commerce. It is proposed to complete the new furnace by the end of the year. The present plant of the August Thyssen works includes eight blast furnaces, seven with capacities ranging from 500 to 700 tons daily and one of 1200 tons, completed in December, 1928.

British Shipyard Quiet—Tin Plate Demand Large

LONDON, ENGLAND, April 11.—The heavy steel industry is depressed. Export demand is generally limited to Colonial Government orders. Canada has placed a few orders and some tonnage has been received from Japan, but the work, when allotted to the various mills, is of little consequence. New ship building is quiet, and as vessels are launched there is but little new tonnage to replace them.

Tin plate mills are active and, with new canning factories springing up in this country and abroad, consumption of tin plate is likely to increase. Recently Sir Edgar Jones, chairman of the Empire Canning Council, said that four years ago an organized national effort was made to expand the canning of fruits in Great Britain, and remarkable progress had been made in that short time. Now attention is being focused on creating a large industry in Great Britain for canning soups, peas and other vegetables. English canners, he said, are preparing to develop export trade in typically English fruits and vegetables.

Continental Tungsten Ore Prices Declining

HAMBURG, GERMANY, April 7.—European consumers of tungsten ore, who recently established a cooperative buying organization, appear to have been successful in forcing the price down. The market has declined from 35s. ($8.50) per unit at the end of last year to 26½s. ($6.44) per unit at the end of March, and a further reduction in price is expected.

Anglo-German Stainless Steel Agreement Extended

ESSEN, GERMANY, April 6.—An agreement for mutual market protection in sales of stainless steel, made in 1912 by the Friedrich Krupp A. G. and the British producers of stainless steel, Thomas Firth & Sons and Brown Bayley's Steel Works, Ltd., is understood to have been extended a second time, the first extension having been made in 1920. Under the terms, no German stainless steel is exported to the United Kingdom and the British refrain from selling in Germany.

French Decline in Steel Output Small

BORDEAUX, FRANCE, April 9.—That the metallurgical industries in France now occupy the most prosperous position among European producers is borne out by statistics of production in France, Germany, Belgium and Luxemburg for January and February.

French output of steel shows a reduction of only 0.76 per cent compared with the same months of 1929, while in Germany the decline was 10.50 per cent, in Belgium 3 per cent and in Luxemburg 2.50 per cent.

Steel production in France during January and February totaled 1,573,000 tons, compared with 1,595,000 for the same period of 1929. Of the output this year, merchant steel has accounted for 391,000 tons, an increase of 12 per cent over last year; shapes, 124,000 tons, a decrease of 12 per cent; thin sheets, 118,000 tons, an increase of 11 per cent; and rails, 103,000 tons, an increase of 1 per cent.

Fabricated Steel Orders Show Decline in March

WASHINGTON, April 21.—Orders for fabricated structural steel in March totaled 202,437 tons, or 62 per cent of the capacity of 324,335 tons of the firms reporting to the Department of Commerce. This compares with orders of 230,788 tons in February or 69 per cent of the reporting capacity of 336,128 tons.

Computed bookings in March were 248,000 tons, against 276,000 tons in February and 248,000 tons in January. Computed shipments in March totaled 276,000 tons, or 69 per cent of capacity, compared with 292,000 tons or 73 per cent of capacity the preceding month.

For the first quarter, orders reported totaled 642,777 tons, or 64 per cent of the reporting capacity of 997,521 tons. This shows a drop of 14 per cent from the 746,169 tons, or 77 per cent of the reporting capacity of 962,110 tons, for the like period of last year.

Computed bookings for the first three months were 772,000 tons in 1930, against 897,050 tons in 1929. Computed shipments were 812,000 tons, or 68 per cent of capacity, against 796,950 tons, or 69 per cent of capacity, a year ago.

Jones & Laughlin Sending Its 100th Barge Tow

The Jones & Laughlin Steel Corporation, Pittsburgh, on April 16, sent south its 100th river shipment of steel products. Consisting of the usual line of products, including pipe, bars, shapes, plates, reinforcing bars, wire, nails, spikes, steel piling, and cold-finished steel bars for warehouses at Memphis, Tenn., New Orleans, and intermediate points, the "Century Tow," as it has been designated, will stop at a number of cities en route in order to give interested parties an opportunity to inspect the barges and get an idea of the way river shipments are made. The tow consisted of 13 barges, one for Cincinnati, one for Louisville, eight for Memphis, and three for New Orleans. Officers of the Jones & Laughlin company accompanied the shipment. The company was the first to utilize the present system of river delivery of manufactured steel products, having dispatched its first tow late in 1921.

Continental Steel List

A comprehensive list of extras on finished steel rolled on the continent is contained in a booklet published by Edward Le Bas & Co., Dock House, Billiter Street, London, E.C.3, England. Size extras are given for Continental steel bars, angles, channels, tees, beams, plates and sheets, and details are included on rolling and cutting margins.

Industrial Machinery Exports Grow

European Countries Lead as Chief Export Outlets—Total Is Practically Doubled Since 1924

EUROPE held first place as a market for American industrial machinery last year, surpassing all Latin America in this respect for the second consecutive year, according to an analysis by S. R. March of the Commerce Department's industrial machinery division. This development occurred, it is pointed out, in face of the fact that shipments to Latin America were the largest in many years.

Exports to Europe, valued at $78,800,000, represented 23 per cent increase over the 1928 total, which was, in turn, the largest since the immediate post-war years. This substantial growth in sales to the world's most highly competitive markets is significant, in view of the questions raised as to the ability of the American product to compete effectively with lower-priced foreign machinery.

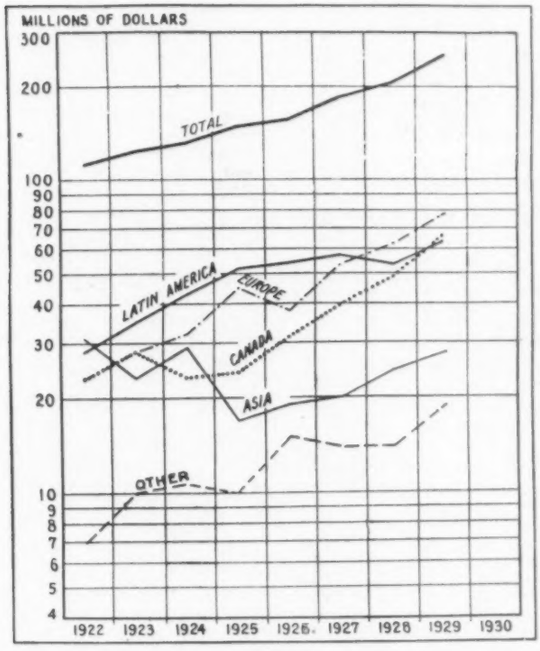
It is true, however, that this trade was largely in highly specialized machinery. European demand for the simpler types of general-purpose machinery is being largely supplied by domestic industry. Nearly one-third of the total shipments to Europe consisted of metal-working machinery.

Canada Holds First Place

Shipments to all of the principal market areas of the world showed substantial increases and were the largest in many years, with the single exception of the West Indies. Canada (including Newfoundland), with the urgent requirements of a pioneer country, continued to hold first place among individual countries. Metal-working machinery and construction and conveying machinery were the two leading items in this trade, shipments in each group being in excess of $8,000,000, although power-generating machinery and textile, sewing and shoe machinery also shared well.

Trade with South America, Mexico and Central America and the West Indies all moved upward, despite adverse conditions in several countries in this area.

Exports to Asia, Australasia, and Africa exceeded those of any recent years. This is taken to indicate that the industrialization of these countries, which received a temporary setback immediately following the war, is now proceeding on a more normal basis.



CHANGES in Destination of Industrial Machinery Exports from the United States Are Shown in This Diagram. Europe, our most active competitor, is also our heaviest customer and has been so for two years. And now Canada has passed Latin America, which takes third place, after holding the lead from 1923 through 1927

Russian Trade Doubled Since 1927

Trade with Russia and with France was probably the most interesting feature of the year. Within the short space of four years Russia has moved from twelfth to third largest customer of the United States, the gain for the years 1927 and 1928 being approximately $2,000,000 each, while that for 1929 was in excess of $5,000,000 to a total of $13,737,779.

It must be borne in mind, however, that this trade has been stimulated by Russia's ambitious industrial plans and cannot be taken as an indication of a normal or permanent expansion. This trade is now abnormally large as a result of Russia's five-year plan, which took effect with the fiscal year 1928-29. Shipments to Russia have consisted mainly of metal-working and oil-well and oil refinery machinery, although construction and conveying machinery also held an important place.

Shipments to France showed a sharp gain, to $12,065,549. This is despite the fact that France has at her command the convenient "deliveries in kind" system of obtaining her machinery requirements from Germany, whereby they are charged to reparations account. More than half of the trade with France was in metal-working machinery. This may be accounted for largely by retooling operations on the part of the leading French automobile manufacturers, and also by the establishment of American branch factories.

Great Britain has stood in second position for several years. Mexico was fourth last year, and France fifth. No other country reached $9,000,000, though Argentina, Venezuela and Japan, in that order of size, were all past $8,000,000.

UNITED STATES EXPORTS OF INDUSTRIAL MACHINERY

(Thousands of Dollars)

	1924	1925	1926	1927	1928	1929
Canada, etc.	$23,297	$24,134	$31,072	$39,000	$49,727	$66,867
Europe (except Balkans)	32,159	45,688	38,342	53,225	63,830	78,787
South America	19,247	26,328	34,685	33,685	32,427	38,465
Mexico and Central America	11,524	13,005	11,721	11,527	13,302	15,184
West Indies	12,701	13,100	7,561	11,345	8,965	10,255
Total Latin America	43,472	52,433	53,967	56,557	54,494	63,904
Asia (except Near East)	21,826	16,582	19,249	19,740	24,024	28,381
Australasia	5,774	6,039	7,425	7,928	6,460	8,085
Africa	3,358	3,251	4,539	5,084	4,689	6,304
Other countries	950	1,252	2,011	1,635	2,988	4,757
Total	$130,836	$149,379	$156,605	$183,169	$206,212	$257,085
Percentage to:						
Latin America	33.2	35.1	34.5	30.9	26.4	24.9
Asia	16.7	11.1	12.3	10.8	11.6	11.0
Canada, etc.	17.8	16.2	19.8	21.3	24.1	26.0
Europe	24.6	30.6	24.5	29.0	31.0	30.6
Australasia	4.4	4.0	4.7	4.3	3.1	3.1
Africa	2.6	2.2	2.9	2.8	2.3	2.5
Other countries	.7	.8	1.3	.9	1.5	1.9

Machinery Markets and News of the Works

Chicago Market More Active

Railroad and School Lists and Buying by Motor Car Company Enliven Trade

THE Chicago machine tool market has become more active in the past week, with the issuance of fair-sized lists by the Milwaukee Road and the Chicago Board of Education and the placing of orders for production equipment by the Nash Motors Co. for its Milwaukee and Racine, Wis., plants.

In other sections of the country business is virtually unchanged. The machine tool trade generally describes conditions as dull, although a fair amount of business is being done and sales organizations have an abundant number of prospects, inquiries having been coming in at a fairly good rate.

Cincinnati machine tool builders report that sales have not gained this month, and in some instances they show a loss as compared with the corresponding period in March. Production of tools in that district has been quite generally curtailed.

In addition to the tools for which the Milwaukee Road is inquiring in Chicago, other railroads are actively in the market. The Santa Fe is placing orders against a list issued some time ago, and the Northern Pacific, Burlington and Chicago & North Western are in the market for small lots of tools.

New York

NEW YORK, April 21.—Machine tool sales in the first half of this month were at about the March level with most sellers, but the past week has been quiet. Industrial users of tools are providing most of the current business, the railroads postponing indefinitely purchase of the greater part of their requirements. The Delaware, Lackawanna & Western, recently in the market for 12 machine tools, has closed on a brass turning lathe and a sensitive drill and abandoned the rest of the list. The New York Central, which has been inquiring for a substantial number of tools for Buffalo, has curtailed its expected purchases for these shops to two or possibly three tools. The International Business Machines Corporation, New York, with a plant at Endicott, N. Y., has closed on a small list of machine tools, and the International Motor Co., Plainfield, N. J., has bought a number of tools, including crankshaft lathes. A manufacturer in the New York district has purchased a brake for export to South America, and a bridge repair company in Brooklyn has also closed on a brake.

Col. Clarence D. Chamberlin, president, Crescent Aircraft Corporation, 372 Lembeck Avenue, Jersey City, N. J., is at head of new corporation now being organized to construct and operate airport and seaplane base at Doyers Point, near factory, for service in metropolitan New York district. It will include hangars, repair and reconditioning shops, flying school, storage and distributing buildings and other field structures, entire project to cost over $400,000 with equipment.

Union Carbide & Carbon Co., 30 East Forty-second Street, New York, has acquired 9-acre tract at Detroit, and plans early construction of new plant for production of acetylene gas, welding apparatus, etc., to be operated by one of subsidiaries, to cost over $175,000 with equipment.

Bloch & Hesse, 18 East Forty-second Street, New York, architects, have filed plans for six-story automobile service, repair and garage building on West Sixty-sixth Street, to cost $150,000 with equipment. Solon Herzig, 415 Lexington Avenue, is consulting engineer.

Segal Lock & Hardware Co., Inc., 12 Warren Street, New York, operating Norwalk Lock Co., Norwalk, Conn., as a subsidiary, has arranged for a bond issue of $700,000, part of fund to be used for expansion and improvements.

General Electric Co., Schenectady, N. Y., is planning new plant at St. Louis for manufacture of electrical equipment, initial unit to cost more than $20,000,000 and ultimate project over three times that sum.

Board of Trustees, Rensselaer Polytechnic Institute, Troy, N. Y., has awarded general contract to Amsterdam Building Co., 441 Lexington Avenue, New York, for two and three-story mechanical shop and fine arts building, to cost over $400,000 with equipment. J. M. Lawlor, 15 West Thirty-eighth Street, New York, is architect.

Board of Education, Park Avenue and Fifty-ninth Street, New York, has included two additional vocational schools in 1930 program recently noted, covering addition to manual training school at Brooklyn, to cost $600,000, and Brooklyn technical high school to cost $5,500,000 with equipment. W. C. Martin, Flatbush Avenue Extension and Concord Street, Brooklyn, is architect.

Thomas & Betts Co., 15 Park Place, New York, manufacturer of electrical fittings, conduits, etc., has asked bids on general contract for new three-story plant, 80 x 180 ft., at Elizabeth, N. J., to cost over $90,000 with equipment. Lockwood Greene Engineers, Inc., 100 East Forty-second Street, New York, is architect and engineer.

Board of Passaic County Chosen Freeholders, Court House, Paterson, N. J., will take bids within 30 to 60 days for County airport on Paterson-Hamburgh Turnpike, Preakness, to include hangars, repair shop, oil storage and other field units, to cost about $180,000 with equipment. Austin Co., 120 Broadway, New York, is architect and engineer.

Anderson Oil Co., 219 Elmwood Avenue, Bogota, N. J., has plans for two-story storage and distributing plant at North Bergen, N. J., to cost about $25,000 with equipment. Lucht & Anderson, 432 Palisade Avenue, Cliffside, N. J., are architects.

William Prym of America, Inc., 16 West Nineteenth Street, New York, manufacturer of metal goods, has plans, by W. E. S. Dyer, Land Title Building, Philadelphia, architect and engineer, for one-story plant at New Brunswick, N. J., 250 x 265 ft., to cost over $500,000 with machinery. Bids on general contract will be taken at once.

California Spray Chemical Co., 204 Franklin Street, New York, manufacturer of spray materials, spraying equipment, etc., with main plant at Watsonville, Cal., has leased building at Bayway, Elizabeth, N. J., for new Eastern branch plant.

Jersey Central Power & Light Co., 20 South Street, Asbury Park, N. J., has arranged for a bond issue of $4,000,000, part of proceeds to be used for extensions and improvements in power plants and system. Company has work under way on a new steam-operated electric generating plant at South Amboy, N. J., to cost over $1,500,000 including transmission lines.

Board of Education, 22 Valley Road, Montclair, N. J., is asking bids until May 6 for manual training shop supplies, elementary manual arts equipment and supplies, and other school equipment, as per lists on file at office of Fred P. Reagle, secretary.

Morris Machine Works will move its New York office to Pennsylvania Building, 225 West Thirty-fourth Street, May 1.

New England

BOSTON, April 21. — Machine tool manufacturers appear to be securing most of their business from sources outside of New England. Dealers in new tools report few sales and inquiries. Used tool demand is more active but sales are curtailed by a lack of needed equipment.

New England railroads give no promise of becoming a factor in the machine tool market. The Readville, Mass., shops of the New Haven railroad are now working only four days a week and other railroad shops are on curtailed schedules. Insulated wire making companies in Connecticut are increasing operations; Massachusetts electrical equipment manufacturers are also more active.

R. M. Kaulback, Malden, Mass., automobile spring servicing, will start work soon on a one-story addition, 48 x 70 ft. Drilling tools are under consideration.

Town of Ipswich, Mass., will soon make a small addition to its electric lighting plant. New motor equipment will be installed.

H. H. Arnold Co., Rockland, Mass., textile machinery, shoe machinery knives and reamers, has awarded contract for a one-story machine shop addition, 50 x 60 ft.

Maine Seaboard Paper Co., Augusta, Me., has started work on a newsprint manufacturing plant at Bucksport, Me., to cost $6,000,000 with equipment. Grinding and miscellaneous equipment is under consideration.

John W. Lahey, Danbury, Conn., has awarded contract to H. Kohler & Son, Danbury, for one-story addition to machine shop, 31 x 35 ft., to cost about $20,000 with equipment.

Bethlehem Shipbuilding Co., 100 Milk Street, Boston, has awarded general contract to Clark & Smith, Inc., 13 Temple Street, Quincy, for one and two-story bolt and rivet shop at Fore River Shipyard, Quincy, to cost about $45,000 with equipment. H. B. Bisbee is company engineer.

Board of Education, Pawtucket, R. I., has authorized installation of manual training department in new Darlington junior high school to cost $500,000. Bids will soon be asked on general contract. Monahan & Meikle, Pawtucket, are architects.

George E. and James H. Kimball, Otis Street and Burdett Avenue, Hingham, Mass., have organized George E. Kimball & Son Co., with capital of $100,000, to operate local plant for manufacture of tools, machine parts, etc. First noted will be president, and latter, treasurer.

Eastern Avenue Auto Parts Co., 182 Eastern Avenue, Malden, Mass., has plans for one-story addition, to cost about $35,000 with equipment. G. A. Cornet, 7 Monroe Street, Lynn, Mass., is architect.

Chapman Valve Mfg. Co., Springfield, Mass., manufacturer of heavy gate valves, etc., has plans for two one-story additions, to cost over $50,000 with equipment. McClintock & Craig, 458 Bridge Street, are architects.

Warren Telechron Co., Ashland, Mass., manufacturer of electric clocks, bells, etc., a subsidiary of General Electric Co., has awarded general contract to H. L. Hauser Building Co., 263 Summer Street, Boston, for two-story addition, to cost about $50,000 with equipment. Fay, Spofford & Thorndike, 44 School Street, Boston, are architects.

Veeder-Root, Inc., Hartford, Conn., has bought controlling interest in Holo Krome Screw Corporation, same city. Latter company manufactures hollow set screws and cap screws.

South Atlantic

BALTIMORE, April 21.—Potomac Electric Power Co., Fourteenth and C Streets, Washington, has awarded general contract to S. J. Prescott Co., 814 Thirteenth Street, for five-story equipment storage and distributing plant, with meter department, etc., to cost about $300,000 with equipment.

Russia Cement Co., Gloucester, Mass., manufacturer of adhesive cements, glues, etc., has merged with Victor G. Bloede Co., 703-9 Caton Avenue, Baltimore, manufacturer of kindred products, and will operate as unit of organization. Plans are under way for expansion at last-noted plant, to cost over $100,000 with equipment. Russia company proposes to remove a number of departments to Baltimore factory and increase output.

Bureau of Standards, Department of Commerce, Washington, is planning construction of new hydraulic laboratory for experimental work, to cost about $350,000 with equipment.

Durham Gas Co., Durham, N. C., is planning extensions of pipe lines for high pressure artificial gas service at Chapel Hill, N. C., and vicinity, to cost about $100,000 with pressure stations, etc.

Hy-Grade Manganese Co., Woodstock, Va., has authorized an expansion and improvement program at local mining properties, including installation of equipment to develop an output of 600 tons of ore daily, with processing mill for a capacity of 100 tons daily, to cost about $200,000 with equipment.

St. Paul Garage Co., Baltimore, has awarded general contract to Consolidated Engineering Co., Inc., St. Paul and Franklin Streets, for multi-story service, repair and garage building, to cost over $600,000 with equipment. Wyatt & Nolting, Keyser Building, are architects.

Davison Chemical Co., Garrett Building, Baltimore, manufacturer of industrial chemicals, etc., is considering two-story addition to plant in Curtis Bay section, to cost about $200,000 with equipment. Company engineering department is in charge.

Board of District Commissioners, District Building, Washington, is considering installation of manual training equipment in new three-story Reno junior high school to cost about $500,000, for which bids will be asked on general contract early in June. A. L. Harris, address noted, is municipal architect; P. L. Dougherty, same address, is engineer.

Board of Aldermen, Kinston, N. C., is asking bids for equipment for municipal electric light and power plant until May 7, including a 3500-kw. turbo-generator with direct-connected exciter; one surface condenser for generating unit noted, vacuum pump, motor-driven hot well pump, steam turbine-driven hot well pump; generator and exciter switchboard panels, with instruments and accessories; and one crane. Bids recently received for similar equipment have been rejected. William C. Olsen, Inc., Raleigh, N. C., is engineer; Cecil Wooten is chairman of board.

Hafleigh & Co., Pulaski Avenue and Ruffner Street, Philadelphia, manufacturers of buttons, are arranging for purchase of former plant of Continental Can Co., Buchanan, Va., and will remodel for new factory for bone button manufacture, to cost over $40,000 with machinery.

Virginia Electric & Power Co., Richmond, Va., has arranged for a stock issue to total $2,000,000, part of proceeds to be used for extensions and improvements in power plants and system, including development of hydroelectric power facilities on Roanoke River.

Blevins Aircraft Corporation, Atlanta, Ga., is planning extensions in shop and repair facilities at Candler Field, including installation of tools and equipment. J. H. Candler is president.

Mallory Machinery Corporation, 522 Light Street, Baltimore, is seeking a used 300-ft. belted compressor and a 15 or 20-ton capacity stiff-legged derrick.

Philadelphia

PHILADELPHIA, April 21.—Department of Supplies and Purchases, City Hall Annex, Philadelphia, Jay Lit, director, will receive bids until April 28 for air compressors, nozzle couplings and other equipment, as per lists on file.

American Smelting & Refining Co., 120 Broadway, New York, is arranging for acquisition of Girard Smelting & Refining Co., Tacony, Philadelphia, producer of refined metals, and will consolidate. It is understood that local works will be continued at present location. Joseph Axelrod is president of Girard company, and Louis Schwab, secretary.

John A. Munning, 5445 Rising Sun Avenue, Philadelphia, and associates have organized Munning & Munning, Inc., with capital of $50,000, to operate local works for manufacture of electroplating, polishing, buffing and kindred mechanical equipment. Mr. Munning will be treasurer of new organization. August P. Munning, 226 Main Street, Matawan, N. J., recently resigned as chairman of board of Hanson-Van Winkle-Munning Co., is one of incorporators of new organization, and will be active with company.

Philadelphia Spring Works, 1320 Poplar Street, Philadelphia, has leased for expansion one-story building on site, 51 x 176 ft.

Austin N. Leidy, Phillipsburg, N. J., electrical equipment and supplies, is planning to rebuild storage and distributing plant destroyed by fire April 11.

State Board of Education, State Office Building, Trenton, N. J., will receive bids until May 6 for a boiler plant at new State Teachers' College and State Normal School, Ewing Township. Guilbert & Betelle, 20 Branford Place, Newark, N. J., are architects.

Harrisburg Flying Service, Inc., Harrisburg, Pa., George G. McFarland, president, has acquired 193-acre tract near Harrisburg Fair Grounds, and will construct and operate airport, to be known as Penn-Harris Airport, including hangars, repair shop and other field units, to cost over $70,000 with equipment.

David Miller, 539 Mercer Avenue, Lancaster, Pa., manufacturer of umbrella handles, etc., plans rebuilding part of factory recently destroyed by fire.

Asbestos Insulating Co., Main and Astor Streets, Norristown, Pa., recently organized with capital of $100,000 by H. Nelson Reifsnyder, 1567 Sheridan Lane, and associates, plans operation of local plant for production of asbestos, sheet metal and kindred insulating products. Mr. Reifsnyder will be treasurer; Robert

L. Wilkinson, Curren Terrace, is interested in new company.

Board of Public Education, Philadelphia, plans installation of manual training equipment in new three-story junior high school to cost $840,000, for which plans have been filed. Irwin T. Catharine, Franklin Trust Building, is architect for board.

American Chemical Paint Co., Ambler, Pa., has acquired acid cleaning department of Rex Products & Mfg. Co., Detroit.

Buffalo

BUFFALO, April 21.—Olean Metal Cabinet Works, Inc., Exchange National Bank Building, Olean, N. Y., has awarded general contract to L. A. Harding Construction Co., 1335 Main Street, Buffalo, for one-story plant unit, to cost about $100,000 with equipment. A. W. E. Schoenberg, First National Bank Building, Olean, is architect. H. C. Hallock is general manager.

Officials of Algonquin Paper Corporation, Ogdensburg, N. Y., have organized Algonquin Pulp & Paper Co., Inc., to take over and expand present company. Frank A. Augsbury and Clarence S. Cook will head new organization.

Claude Neon Lights, Inc., 41 East Forty-second Street, New York, manufacturer of electric tube-lighting equipment, has acquired plant and business of Sun Ray Neon Corporation, 310 East Avenue, Rochester, N. Y., manufacturer of similar equipment, for new branch plant.

Niagara Wall Socket Stove Co., Inc., Buffalo, care of Homer H. Woods, 196 North Street, recently formed by Mr. Woods and associates with capital of $60,000, plans operation of local factory for manufacture of electric heating equipment and devices. Ralph M. Andrews, 198 North Street, is also interested in new organization.

Department of Mental Hygiene, State Office Building, Albany, N. Y., will receive bids until April 30 for addition to power plant at Willard State Hospital, Willard, N. Y.

Cincinnati

CINCINNATI, April 21.—Despite briskness of inquiry for machine tools in this district, orders continue sluggish. In fact, manufacturers indicate that the first half of April was below the level for the same period in March. Machine shops appear to be marking time, so far as purchases are concerned, and are awaiting the trend of general business conditions. New bookings the past week were mostly for single tools of standard types. With unfilled orders virtually completed, production has been curtailed, and most plants in this district are operating at less than capacity.

Foreign business has receded. The Amtorg Trading Corporation, which has an inquiry out for 30 to 40 machines, has been limiting purchases to single items since the initial contract for 13 lathes.

Brighton Copper Works, 2160 Western Avenue, Cincinnati, has asked bids on general contract for new one-story and basement plant, 56 x 100 ft., to cost about $40,000 with equipment. J. C. Grunkemeyer and C. W. Sullivan, 3717 Eastern Avenue, are associate architects. Alvin Hock is head.

Gummed Products Corporation, Union Street, Troy, Ohio, manufacturer of paper goods, has plans for two and three-story addition, to cost over $100,000 with machinery. Schenck & Williams, Third National Bank Building, Dayton, Ohio, are architects.

City Council, City Hall, Cincinnati, C. O. Sherrill, city manager, is considering construction of a multi-story municipal automobile service, repair and garage building, to cost over $225,000 with equipment. City engineering department will be in charge.

De Sota Paint & Varnish Co., East Railroad Avenue, Memphis, Tenn., has awarded general contract to B-W Construction Co., 720 Cass Avenue, Chicago, for one-story addition to factory, including new boiler house, to cost about $50,000 with equipment. Company is a subsidiary of Sears, Roebuck & Co., Chicago.

Linde Air Products Co., 30 East Forty-second Street, New York, manufacturer of commercial oxygen, welding equipment, etc., is planning new plant at Chattanooga, Tenn., to cost over $60,000 with equipment. Prest-O-Lite Co., manufacturer acetylene gas apparatus and devices, an affiliated organization, is considering branch plant on adjoining site, to cost close to like sum.

King-Dobbs Co., 416 East Eleventh Street, Chattanooga, Tenn., is considering construction of multi-story cold storage and refrigerating plant, to cost over $250,000 with machinery.

Cities Service Oil Co., 4700 Prospect Avenue, Cleveland, has plans for a one-story storage and distributing plant at Springfield, Ohio, to cost about $140,000 with equipment.

Board of Education, Marion, Ohio, is planning installation of manual training equipment in new high school to cost $325,000, for which bids are being asked on general contract. Garber & Woodward, 4 West Seventh Street, Cincinnati, are architects.

Ohio Edison Co., Springfield, Ohio, has secured permission to issue preferred stock in amount of $5,000,000, part of proceeds to be used for extensions and improvements in power plants and system.

The Crane Market

BUSINESS in overhead traveling cranes continues fairly active, although the volume of new inquiry is not quite so large as in previous weeks. The Electric Management & Engineering Corporation, 84 William Street, New York, has placed a 60-ton, 43-ft. 10-in. span, 4-motor, power house crane for South Amboy, N. J., with the Whiting Corporation, which is also understood to have received the award of a 20-ton overhead crane from the Anaconda Copper Mining Co., New York. Two cranes, 60 ton and 35 ton, have been awarded by the Phoenix Utility Co., 71 Broadway, New York. The Harry Burnstein Cut Stone Co., Brooklyn, N. Y., has placed a 5-ton, 60-ft. span crane with the Milwaukee Electric Crane & Mfg. Corporation, and M. W. Kellogg & Co., Jersey City, N. J., have closed on a 12½-ton, 2-motor crane. The Milwaukee Road will buy six pouring cranes with 17-ft. span.

Inquiry for locomotive cranes continues small. The New York Edison Co. and the United Electric Light & Power Co. have each issued an inquiry for a crawl-tread crane of 20 to 25-ton capacity for use at the Hell Gate power station in New York. The Standard Oil Co. of New Jersey has placed a small truck crane with the Browning Crane Co. and has renewed an old inquiry for a 20-ton locomotive crane. The Semet-Solvay Co., Harriet, N. Y., has closed on a 19-ft. gage electric locomotive crane with the Orton Crane & Shovel Co.

Pittsburgh

PITTSBURGH, April 21.—April business has failed to justify expectations at the beginning of the month, in the case of most dealers, and reports regarding the volume of new inquiries are mixed. General inquiries seem to be rather light and, while a few dealers have had the opportunity to quote privately on a number of tools, others have not been so fortunate and find prospective buying rather discouraging.

The American Bridge Co. has made inquiry for a number of tools for its Ambridge, Pa., plant, but a large part of the remainder of pending work is accounted for by single tools. Replacement parts are in active demand and some buyers are reconditioning old machinery rather than purchasing new tools this year.

Board of Education, Wilkinsburg, Pa., will receive bids until May 5 for implements, manual training department supplies, etc., as per lists on file. L. R. Hagan is secretary.

Capstan Glass Co., Connellsville, Pa., has awarded general contract to Austin Co., Pittsburgh, for one-story addition, 150 x 340 ft., to be occupied under lease by Fort Wayne Corrugated Paper Co., Fort Wayne, Ind., for branch plant to manufacture corrugated boxes, containers, etc., to cost over $150,000 with equipment.

Main Aeronautics Co., Pittsburgh, operating Pittsburgh-Greensburg airport, has purchased Pittsburgh School of Aviation, and will operate as unit. Facilities will be provided at airport for training school service, including repair and reconditioning shops for instruction, etc. R. V. Trader, president and owner of school, will continue as director of instruction.

Gulf Refining Co., Frick Annex, Pittsburgh, has acquired property at Bluefield, W. Va., and will construct new central oil storage and distributing plant, to cost over $100,000 with equipment.

Twelfth Street Garage, Wheeling Bank & Trust Building, Wheeling, W. Va., C. A. Vaden, president, is asking bids on general contract until May 10 for six-story service, repair and garage building, 65 x 125 ft., to cost about $125,000 with equipment.

Reliance Steel Castings Co., Twenty-eighth and Smallman Streets, Pittsburgh, will soon begin erection of one-story foundry addition, to cost over $40,000 with equipment. Lake & Davidson, Negley Building, are architects.

Lewistown Aircraft & Airways, Inc., Lewistown, Pa., has acquired 70 acres on William Penn Highway, near city, and will establish airport, including hangar with repair facilities and other field buildings, on which work will soon begin. A flying school will be included, of which Henry Noll will be instructor.

Chicago

CHICAGO, April 21.—The local machine tool market is enlivened by lists from the Chicago Board of Education, the Milwaukee Road, and other railroad orders. The Nash Motors Co. also is actively buying equipment for its Milwaukee and Racine plants. The Santa Fe is still placing orders against its list and is asking for prices on a 6-in. pipe machine and a 16-in. x 6-ft. lathe. The Northern Pacific will buy a 5-ft. radial drill; the Union Pacific has need for three motor-driven air hammers, the Chicago & North Western will purchase a power slitting machine and the Burlington is in the market for two 18-in. x 8-ft. lathes. Kalman Steel Co., Chicago, is taking prices on a shear.

List for the Milwaukee Road follows:

Several electric hand tools.
One 150-cu. ft. per min. compressor.
One reamer grinder.
One ½-in. rotary shears.
One 1-in. bolt trimmer.
One 8-in. bolt header.
Two 26-in. drill presses.
One 1½-in. bolt header.
One 42-in. car wheel boring machine.
One burnishing lathe.
Two axle lathes.
One 18-in. x 3-in. dry grinder.
One 2-in. double head pipe and nipple machine.
One double head axle lathe.
Four electric rivet heaters.

Chicago Board of Education will buy the following equipment for the Austin High School:

18 14-in. x 5-ft. geared head lathes.
One power hack saw.
Two bench sensitive drills.
One 14-in. shaper.
Two wet tool grinders.
One 24-in. sliding head drill.
One drill grinder.
Three ¼-in. high speed drills.
One universal cutter and tool grinder.
One centering machine.
One No. 2 universal miller.

Recent sales of Ingersoll Steel & Disc Co., Galesburg, Ill., set a new high record, according to C. S. Davis, president of Borg-Warner Corporation, of which Ingersoll company is a subsidiary. Sales in March, 1930, were between 15 and 20 per cent ahead of March, 1929, and second only to January, 1929, which was largest month in company's history.

Arrowhead Steel Products Co., Minneapolis, has plans for a second-story addition over a part of its present 600-ft. factory.

Fredericks Armature Corporation, 1619 South Michigan Avenue, Chicago, manufacturer of electrical armatures and kindred products, has leased 30,000 sq. ft. floor space, in building at 1315-25 South Wabash Avenue, and will remove to new location, where production will be advanced.

Union Starch & Refining Co., Granite City, Ill., has asked bids on general contract for two additions, one four stories and basement, 70 x 130 ft., another two stories, 68 x 70 ft., to cost over $100,000 with equipment. D. A. Bohlen & Son, Majestic Building, Indianapolis, are architects. Headquarters are at Columbus, Ind.

Northern Pacific Railway Co., Railroad Building, St. Paul, Minn., has plans for a new engine house with repair facilities at Duluth, Minn., to cost about $45,000 with equipment. O. M. Rognan is company engineer, address noted.

Vortex Mfg. Co., 421 North Western Avenue, Chicago, manufacturer of paper cups and kindred products, has plans for a six-story addition, to cost over $100,000 with equipment.

Farmers' Union Terminal Association, 418 Guardian Life Building, St. Paul, Minn., M. W. Thatcher, general manager, is planning addition to grain elevator, with elevating, conveying and other mechanical equipment, to cost over $100,000.

Swift & Co., Union Stock Yards, Chicago, have approved plans for a new three-story cold storage and refrigerating plant at Clinton, Iowa, to cost about $100,000 with machinery.

Chicago, Burlington & Quincy Railroad Co., 547 West Jackson Boulevard, Chicago, is planning construction of engine house with repair facilities at Dayton's Bluff, St. Paul, Minn., to cost about $60,000 with equipment.

Caterpillar Tractor Co., Peoria, Ill., manufacturers of tractors, graders and kindred heavy machinery, has awarded general contract to Austin Co., Cleveland, for one-story assembling unit, 395 x 405 ft., to cost about $200,000 with machinery.

Detroit

DETROIT, April 21.—Board of Water Commissioners, 735 Randolph Street, Detroit, is asking bids until April 30 for pumping station and auxiliary units at Springwells, Dearborn, for municipal waterworks, entire project to cost about $3,000,000.

Thompson Products, Inc., 7881 Conant Street, Detroit, is arranging for production of twin-cycle shock absorbers, a new product recently perfected, and will install equipment for that purpose. Company will also develop maximum capacity for eccentric tie rods, for which large orders have been received.

Unit Corporation of America, Inc., West Allis, Wis., has removed plant of its affiliated organization, Universal Power Shovel Co., from Detroit to West Allis, where production will be concentrated in future. W. H. Schmidt is president and general manager.

Board of Education, Escanaba, is planning installation of manual training equipment in new junior high school to cost about $400,000, for which plans are being prepared by H. N. Turner, Michigan Trust Building, Grand Rapids, architect.

Stevens Roller Bearing Corporation, Detroit, recently organized with capital of $50,000 by Daniel Stevens, 5913 Stanton Avenue, and associates, plans operation of local plant for production of roller bearings and kindred equipment for automobiles. Frederic D. Hegwood, Detroit, is interested in new organization.

Waterloo Ice & Milling Co., 1126 West Front Street, Monroe, is considering construction of a one-story ice-manufacturing plant, to cost about $60,000 with equipment.

Detroit Septic Tank Co., 14580 Pierson Street, Detroit, has arranged for change of company name to Redford Tool & Die Co., and will specialize in such products.

Board of Education, 1354 Broadway Avenue, Detroit, is planning installation of manual training equipment in new three-story and basement high school to cost $450,000, for which plans are being drawn by Smith, Hinchman & Grylls, Marquette Building, architects.

Colonial Oil Co., 320 Franklin Street, Grand Rapids, is considering a new oil storage and distributing plant, to cost about $50,000 with equipment. Pierre Londhout, Michigan Trust Building, is architect.

William Darkwood Co., Detroit, recently organized by William Darkwood and associates, will take over and expand company of same name with plant at 645 East Woodbridge Street, manufacturer of screw machine products. Mr. Darkwood will head new organization. Harley A. Dorman is interested in new company.

Cleveland

CLEVELAND, April 21.—The local machine tool market was very dull the past week, sales being confined to single machines, mostly for replacement. Inquiry is also light, although one new inquiry has come out for a fair-sized lot of machinery. Operations of metal-working plants are still greatly reduced, and many buyers who are considering the purchase of additional machinery are withholding orders. The Air Corps, War Department, headquarters in Dayton, during the week purchased a 126-in. power shear from a Cleveland dealer.

Winton Engine Works, Inc., 2116 West 106th Street, Cleveland, has filed plans for a two-story addition, 35 x 155 ft., to cost about $45,000 with equipment.

Union Metal Mfg. Co., Canton, Ohio, manufacturer of street-lighting standards, is planning one-story addition, to cost about $25,000 with equipment.

John Velcio, Youngstown, has acquired former plant of East Palestine Rubber Co., East Palestine, Ohio, on site 60 x 400 ft., and will remodel for new plant to manufacture electrical apparatus.

Toledo Scale Co., Toledo, Ohio, manufacturer of scales, balances, etc., is contemplating a branch plant at San Francisco, primarily for assembling, to cost over $80,000 with machinery. William A. Zolg is secretary and treasurer.

Master Tire & Rubber Corporation, Akron, Ohio, has been organized with capital of $2,000,000 and 135,000 shares of common stock, no par value, to take over and consolidate Falls Rubber Co., Akron, and Cooper Corporation, Findlay, Ohio, both manufacturers of rubber products, including tires, tubes, etc. New company is considering acquisition of other companies in same line. Ira J. Cooper, head of Cooper Corporation, is president, and Frank C. Millhoff, Akron, formerly connected with Miller Rubber Co., same city, is vice-president.

Standard Oil Co., East Ohio Gas Building, Cleveland, has plans for a distillation plant, with storage and distributing facilities, to cost about $85,000 with equipment.

City Ice & Fuel Co., 6611 Euclid Avenue, Cleveland, has purchased plant and business of Seaboard Terminal & Refrigeration Co., Jersey City, N. J., including ten-story cold storage and refrigerating plant, with ice-manufacturing plant of 500 tons per day capacity, and will consolidate. Purchasing company plans expansion in Eastern district.

Lorain Automatic Icer Co., 3953 St. Clair Avenue, Cleveland, manufacturer of ice and refrigerating equipment, has awarded general contract to H. K. Ferguson Co., Hanna Building, for one and two-story plant to cost about $100,000 with equipment.

Milwaukee

MILWAUKEE, April 21.—Orders for machine tools, while not numerous, are being booked in fair volume and so far this month represent a moderate improvement over March. In most instances, purchasers are insistent upon quick delivery. The local demand is a high light in the general market. Not only is current business good, but large purchases are in prospect. Inquiry from other industrial centers is active.

Allis-Chalmers Mfg. Co., Milwaukee, is taking bids until April 28 for a crane building, switchhouse, etc., 45 x 300 ft., 60 ft. high, at main works in West Allis, to cost about $250,000. Tentative plans also have been prepared for a new machine shop unit, 150 x 580 ft., costing about $300,000. This may be built before the end of the year.

Wesley Steel Treating Co., 651 South Pierce Street, Milwaukee, is erecting a two-story shop addition, 35 x 50 ft., to be ready about June 1. Charles I. Wesley is president and general manager.

Upon completion of a one-story addition, 40 x 90 ft., on a present two-story shop building, Delta Mfg. Co, manufacturer of special wood-working machinery and power tools, will erect a two-story extension, 30 x 82 ft., at 1661 Holton Street, Milwaukee. Plans are by F. F. Drohlshagen, architect, 447 Virginia Street.

Board of Vocational Education, Waukesha, Wis., has approved plans by H. C. Haeuser, architect, 445 Milwaukee Street, Milwaukee, for new vocational school, 120 x 175 ft., two stories and part basement, to cost $100,000 with equipment. Bids will be asked about May 15. O. R. Lindholm is vocational director.

Layton Packing Co., Milwaukee, has engaged Federal Engineering Co., 444 Milwaukee Street, to plan and direct construction of a new cooperage shop, 75 x 150 ft., to cost about $50,000, including equipment.

Allen-Hough Carryola Co., 279 Walker Street, Milwaukee, manufacturer of portable phonographs, small electric motors, radio specialties, etc., has acquired Ampco Metal Golf Club Co., 356 Greenfield Avenue, Milwaukee, and is consolidating production in its own plant. Business will be continued as Ampco Golf Club Division, with Paul W. Hasler as manager.

Bur-Hi Arteraft Corporation, Middleton, Wis., manufacturer of fancy sheet metal containers and specialties, has acquired business and patent rights of Better Products Co., Columbus, Wis., making a general line of stamped metal poultry breeders' equipment, including self-feeders, drinking founts, brooders, hoppers, etc. Production will be consolidated at Middleton, with some additions to capacity of both divisions.

C. R. Meyer & Sons Co., 50 State Street, Oshkosh, Wis., is successful bidder for an addition, 102 x 114 ft., to municipal filtration plant at Oshkosh. With equipment, project will cost about $175,000. Engineers are Pearson, Greeley & Hansen, 6 North Michigan Avenue, Chicago.

Bond issue of $120,000 has been authorized by Common Council of Wauwatosa, Wis., suburb of Milwaukee, for a 1,000,000-gal. steel tank, not elevated, and machinery for a new artesian well of new Blanchard Street pumping station. Bids will be asked shortly after May 1. F. A. Torkelson is city engineer.

Young Radiator Co., Racine, Wis., manufacturer of engine cooling radiators for power units, trucks, tractors, industrial machinery, oil coolers for marine engines, heating units for factories and industrial heating, report a satisfactory gain for first three months of 1930 over same period for 1929.

Racine Tool & Machine Co., Racine, Wis., manufacturer of shear cut production saws and other power metal-cutting saws, has moved into a new and larger factory which provides about three times floor space available in former plant.

St. Louis

ST. LOUIS, April 21.—Wrought Iron Range Co., 5661 Natural Bridge Avenue, St. Louis, has awarded general contract to Murch Brothers Construction Co., Railway Exchange Building, for one-story addition, 30 x 118 ft., to cost about $45,000 with equipment.

Puhl & Hepper Mfg. Co., St. Louis, has been organized to take over and expand company of same name with plant at 5773 Thekla Avenue, manufacturer of sheet metal products and kindred specialties. Edward P. Puhl is one of heads of new organization.

Oklahoma City Mill & Elevator Co., Oklahoma City, Okla., is planning to rebuild part of grain elevator recently destroyed by fire. Company is a subsidiary of General Mills, Inc., Minneapolis.

Armour & Co., James and Central Streets, Kansas City, Kan., meat packers, headquarters at Chicago, have plans for three and five-story addition to plant on State Line, Kansas City, 80 x 90 ft., to cost over $150,000 with equipment.

Kinloch Brass Casting Co., 2356 Palm Street, St. Louis, has filed plans for one and two-story machine shop, 40 x 105 ft., to cost about $45,000 with equipment.

Sherman Machine & Iron Works, 18 East Main Street, Oklahoma City, Okla., is planning to rebuild part of one-story plant recently destroyed by fire.

Terminal Railroad Association, Union Station, St. Louis, has plans for a one-story locomotive shop, 85 x 190 ft., to cost over $75,000 with equipment. A. Reuhmann, Union Station, is architect.

W. N. Brown, 5100 Farlin Street, St. Louis, steel erector, plans two-story structural steel fabricating and assembling shop, to cost about $55,000 with equipment.

Nehi Bottling Works, Shawnee, Okla., has awarded general contract to G. P. Carr Construction Co., Shawnee State National Bank Building, for one-story plant, 35 x 106 ft., to cost about $35,000 with automatic bottling, conveying and other equipment.

New interests, headed by W. J. Muller and Frederic E. Welsh, officials of New Era Motors, Inc., 17 East Forty-fifth Street, New York, have secured control of plant and business of Moon Motor Car Co., 4400 North Main Street, St. Louis, and will operate company in future. Large part of production will be given over to Ruxton automobile, a front wheel drive car, for which New Era company holds patent rights, including both parts manufacture and assembling. Mr. Muller will be president and Mr. Welsh, treasurer; Helm Walker is vice-president.

Cardin Machinery & Electric Co., Cardin, near Miami, Okla., mining machinery, plans rebuilding one-story plant, 125 x 150 ft., recently destroyed by fire.

Kirk-Morrow Iron Works Co., Iola, Kan., has acquired local plant and business of United Iron Works for $486,000, and will consolidate, using purchased facilities for increase in present capacity.

Kansas City Public Service Co., Kansas City, Mo., is in market for a standard coil and elliptical spring testing machine, capacity 25,000 lb.

Missouri Pacific Railroad Co., St. Louis, will erect a 2,000,000-bushel addition to its local elevator on Van Buren Street, at cost of about $700,000 including equipment.

Stockholders of Buck's Stove & Range Co., St. Louis, have voted to liquidate company, which will include disposal of property valued at $500,000, $170,000 in stock, and equipment valued at $50,000.

Gulf States

BIRMINGHAM, April 21.—Southwestern Can Co., Inc., 1207 Mary Street, Houston, Tex., manufacturer of tin cans and other metal containers, is planning one-story plant, 200 x 300 ft., to cost over $100,000 including equipment.

Southwestern Public Service Co., Amarillo, Tex., has work under way on extensions and improvements in local steam-operated electric power plant to double former capacity, to cost over $450,000 with machinery.

Magnolia Petroleum Co., Dallas, Tex., with main refinery at Beaumont, Tex., is planning construction of pipe line from Fort Worth to Dallas, with booster stations, etc., to cost $100,000.

American Concrete Pipe Co., Dallas, Tex., is considering branch plant for production of reinforced-concrete and other cement pipe at Waco, Tex., initial unit to cost about $50,000 with machinery, casting equipment, etc.; J. H. Strange is engineer for company.

All-American Airways, Inc., 226 N. W. Twenty-fourth Avenue, Miami, Fla., is planning expansion at local airport, consisting of one, two and three-story terminal, 620 x 685 ft., with hangar, repair shop and other mechanical divisions, to cost $500,000 with equipment. Other field units will also be constructed. Charles P. Nieder, Calumet Building, is architect; J. H. Wentworth is president and general manager.

West Texas Utilities Co., Abilene, Tex., is considering construction of a steam-operated electric power plant near Lytle Creek, with initial capacity of 20,000 kw., in connection with new artificial lake, on which work is now under way, generating station to cost over $400,000 with transmission lines.

Crystal Oil Refining Co., Commercial Bank Building, Shreveport, La., is planning expansion and improvements in refinery at Cedar Grove, La., including installation of additional machinery.

Quitman County Compress Co., Marks, Miss., has begun construction of new cotton compressing plant, one story, 240 x 430 ft., to be equipped with steam-operated hydraulic presses and auxiliary equipment, to cost over $90,000. D. E. Williams, Clarksville, Miss., will supervise construction.

Great Atlantic & Pacific Tea Co., 420 Lexington Avenue, New York, plans installation of conveying and elevating machinery, factory trucks and other mechanical-handling equipment in new storage and distributing plant at Dallas, Tex., to cost about $100,000.

Houston Oil Co., Houston, Tex., has arranged for a bond issue of $12,000,000, part of fund to be used for extensions and

improvements in plants and system, including new pipe lines for natural gas distribution by its subsidiary, Houston Pipe Line Co.

Uvalde-Del Rio-Eagle Pass Flying Service, Inc., Uvalde, Tex., recently organized by A. B. Mayhew, Uvalde, and associates, has acquired a local tract of 500 acres and plans establishment of airport, including hangars, repair shop and other field units. Project will include establishment of flying schools at three places noted. Dolph Briscoe, Uvalde, is also interested in new organization.

Texas & Pacific Railway Co., Dallas, Tex., has work under way on new engine house and repair shops at Big Spring, Tex., including machine shop, forge shop, brass foundry and other units, to cost over $90,000 with equipment.

Indiana

INDIANAPOLIS, April 21.—American Can Co., 230 Park Avenue, New York, and 1936 South East Street, Indianapolis, has awarded general contract to E. E. Ball & Son, 1131 North Tacoma Avenue, Indianapolis, for extensions and improvements in local plant, to cost about $30,000.

National Electric Products Corporation, 233 Broadway, New York, manufacturer of electric wire and cables, wiring devices, etc., with main plants at Ambridge, Pa., and Bayway, Elizabeth, N. J., has purchased Inca Mfg. Co., Fort Wayne, manufacturer of kindred products, including magnet wire. New owner will operate as a subsidiary and plans to double present capacity. Acquired company was formed recently by George A. Jacobs and Wendell C. Glass, both formerly connected with Dudlow Mfg. Co., now a unit of General Cable Co., and who will continue with National Electric company.

Evansville Malleable Castings Co., 2549 East Colm Street, Evansville, has plans for one-story foundry addition, to cost about $35,000 with equipment.

Ames Shovel & Tool Co., Anderson, has asked bids on general contract for one-story plant, 100 x 600 ft., to cost over $100,000 with machinery, to replace part of works recently destroyed by fire. E. P. Miller, Farmers' Trust Building, is architect.

Advance Rumely Co., La Porte, manufacturer of tractors, threshers, combines and kindred heavy agricultural equipment, is arranging for early closing of plant at Battle Creek, Mich., and will remove to La Porte where manufacture will be concentrated in future. It is purposed to close La Porte plant for short period during summer to improve and expand production facilities.

Citizens' Gas Co., 47 South Penn Street, Indianapolis, has purchased 12-acre tract near Prospect Street plant, and plans early construction of new steel container unit for storage and distribution, to cost $350,000 with equipment and pipe lines.

Pacific Coast

SAN FRANCISCO, April 17.—Folsom Street Iron Works, Seventeenth and Missouri Streets, San Francisco, has awarded general contract to Mission Concrete Co., 270 Turk Street, for one-story plant unit, to cost about $30,000 with equipment. T. W. Lenzen, Humboldt Bank Building, is architect.

Kinney Iron Works, 2724 Santa Fe Avenue, Los Angeles, has plans for a new one-story foundry and shop, 150 x 180 ft., at Vernon, to cost over $50,000 with equipment.

Edison Electric Appliance Co., Ontario, Cal., has plans for a one-story shop addition, to cost over $35,000 with equipment. Headquarters are at 5600 West Taylor Street, Chicago.

Union Oil Co. of California, Mills Building, San Francisco, has plans for a new oil storage and distributing plant at Alameda, Cal., to cost about $100,000 with equipment. Engineering department of company is in charge.

California Rice Growers' Association, Broderick, Cal., is planning to rebuild five-story mill and packing plant recently destroyed by fire.

Municipal Electric Light Department, Centralia, Wash., is asking bids until April 29 for municipal hydroelectric power plant on Nisqually River, near Yelm, including forebay with gates, penstock, tailrace, etc., as well as various equipment; also for 26-mile transmission line from power station to city, and for a 20-ton motor-driven traveling crane, with motor-operated hoist.

Thomas Hamilton, Ellensburg, Wash., has plans for a one-story machine shop at 201 North Pearl Street, 60 x 120 ft., to cost about $25,000 with equipment.

Board of Education, Los Angeles, plans construction of a vocational shop at new high school on Robertson Boulevard, to cost about $400,000, for which plans will be prepared by John C. Austin and Frederic M. Ashley, Chamber of Commerce Building, architects.

Municipal Lighting Department, Seattle, is considering purchase of 15 acres in south end of city as site for new municipal steam-operated electric generating plant, to develop maximum capacity of more than 100,000 hp. Initial unit is expected to cost about $200,000 with equipment.

Globe Oil Tool Co., Los Angeles, has been organized to take over and consolidate H. C. Smith Mfg. Co., Los Angeles; Kemmerer-Wright Co., Hollydale; and National Tool & Metal Co., Torrance, all manufacturers of oil well drilling tools and kindred equipment. Expansion program will be carried out. J. C. Wright is president of new company.

Canada

TORONTO, April 21.—Jules S. Bache, president of Dome Mines, Ltd., announced that bids will be called within a month for a mill, with daily capacity of 1500 tons, at South Porcupine, Ont., to replace one destroyed by fire last fall. Cost is estimated at $750,000. Alexander Fasken, 36 Toronto Street, Toronto, is secretary.

Town Council of Annapolis Royal, N. S., has made application to provincial legislature for permission to borrow $18,000 to purchase new electrical equipment. F. W. Harris is clerk.

J. Flood & Son, 113 Princess Street, St. John, N. B., has been awarded contract for a two-story machine shop, 45 x 165 ft., on Rothesay Avenue, to cost $18,000, for City Council. L. B. Wilson, City Hall, is commissioner.

Dennison Mfg. Co., Farmingham, Mass., has let contract to Dakin Construction Co., Ltd., 270 Beaumont Street, Montreal, for a factory and power house at Drummondville, Que., to cost $125,000.

International Nickel Co. of Canada, Ltd., Copper Cliff, Ont., will start work at once on a crusher house at Creighton Mines, Ont., to cost $125,000. Fraser, Brace, Ltd., Copper Cliff, has general contract.

Bids are being received, no closing date set, by G. M. Miller & Co., architects, 71 Mutual Street, Toronto, for a one-story factory, 80 x 150 ft., for the Otto-Higel Co., Ltd., King and Bathurst Streets, Toronto, manufacturer of piano actions, etc. Tenders do not include mechanical trades.

Canadian Terminals, Ltd., has plans for a 2,000,000-bu. grain elevator at Cataraqui Bay, near Kingston, Ont. A by-law is being prepared to grant a fixed assessment to company and will be submitted to ratepayers of Kingston County. Construction work will be started as soon as ratepayers have passed on by-law.

Superior Alloys, Ltd., Sault Ste. Marie, Ont., has awarded contract to McLarty Brothers, for an addition, 60 x 120 ft., to cost $10,000.

Western Canada

Ratepayers of Nanaimo, B. C., will spend $145,000 for improvements to waterworks plant.

According to a statement by F. R. M. Russell, chairman of Vancouver, B. C., Harbor Commission, $2,200,000 will be spent on construction of a 5,500,000-bu. grain elevator and an additional $5,000,000 on port facilities. Latter amount will cover cost of docks, piers and cold storage plant.

Gore, Nasmith & Storrie, Toronto, have plans for new $3,770,000 waterworks project for Calgary, Alta., construction to start about June 1.

Construction work will be started at once on a $350,000 electric plant at Estevan, Sask., for Dominion Power & Electric Co.

Foreign

CELULOSA ARGENTINA, LTD., Juan Ortiz, near Rosario, Argentina, recently organized with capital of 1,500,000 pesos (about $636,750) has plans for a new mill for manufacture of paper products, using wheat and linseed straws as raw material. Initial plant will consist of four buildings, one of which is under way and other three scheduled for completion by end of year, to cost 1,200,000 pesos (about $510,000) with machinery.

Soviet Russian Government, Moscow, will soon begin construction of coal-mining plant at Odessa, under direction of Roberts & Schaefer Co., 400 North Michigan Avenue, Chicago, consulting engineer, to cost about $4,000,000 with machinery, tipples, power equipment, etc., exclusive of underground construction. Project is scheduled for completion in about 24 months.

In connection with a concession granted by Government of Lithuania to Swedish Match Co., Stockholm, Sweden, for match manufacture and sales for term of 35 years, last-noted company has agreed to construct a paper mill near Njemen, Lithuania, with initial capacity of 4000 tons per annum, to cost over $1,000,000 with machinery.

Venezuelan Petroleum Co., 45 Nassau Street, New York, an interest of Sinclair Consolidated Oil Corporation, same address, is planning an expansion and development program on oil properties in States of Zamora and Monagas, Venezuela, where concessions for over 3,000,000 acres are held. Increased output will be arranged, with drilling, storage and distributing facilities.

The Week's News Quickly Told

Current Events That Bear on the Course of Business

TRADE and manufacturing is still halting, but the Conference of Statisticians in Industry said that trends indicate "the low point of the current movement has been reached for 1930."

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CAR loadings, while 5½ per cent less than the corresponding week in 1929, are improving in relative volume.

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EMPLOYMENT is about stationary, chemical, stone and glass industries being the only manufacturing groups to increase pay rolls in March.

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FARMING is getting off to a good start. Planting in the Mississippi valley, without interference by high water, indicates a record acreage in cotton and feed crops.

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CONSTRUCTION contracts during the first quarter of 1930 totaled $1,100,000,000, considerably less than the average first quarter 1925 to 1929 ($1,350,000,000). Residential construction, at less than half the average, represents a loss which a gain of $100,000,000 in public works and utilities could not counterbalance . . . Federal buildings will be erected within the next year valued at $230,000,000, of which half will be spent in Washington.

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FOREIGN trade (both export and import) since the first of the year has been uniformly about 20 per cent less than for the corresponding months in 1929 . . . Large decreases have occurred in foods, wearables and other organic products . . . Increases, however, are noted in exports of agricultural, electrical and industrial machinery, for which Russia is the principal customer.

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RUSSIAN trade with Great Britain will be stimulated by a guarantee of $150,000,000 credit and diplomatic immunity to the trading agency . . . About 400 Americans, expert in engineering, mining and agriculture, are now in Russia under contracts ranging up to three years, to build and supervise various items on the "five-year economic program" . . . An increasing resistance to collective farming in certain regions has caused the Soviet authorities to slacken efforts in this line, although a 10-per cent increase in acreage under cultivation seems assured.

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TEXTILE industry, internationally, is dull . . . Cotton consumption last month at 570,000 bales is much below the 707,000 bales for March a year ago, yet cotton goods are in oversupply and sales slow . . . Reduced cotton export contributes much to the slackening foreign trade . . . Widespread strikes in Japanese cotton mills followed a wage reduction of 35 per cent . . . More than half the woolen mills in England are closed by strikes following a cut of 10 per cent in wages . . . Woolen fabrics for women's wear, fall of 1930, are 15c. to 37c. per yard lower than in 1929.

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FLYING conditions two miles up were found suitable for long-distance speedy travel by the Lindberghs in a record breaking transcontinental trip . . . An automatic pilot, with gyroscopic control, manoeuvers an Army bomber about San Francisco and Sacramento, Cal . . . Paul Heylandt, in Germany, has constructed a recoil motor which has driven a touring car around a two-mile course at 50 miles per hour. It weighs 7 lb., develops 45 hp. and utilizes the explosive combustion of oil and liquid oxygen.

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GOLD mining is steadily decreasing, yet demands for currency reserves steadily mount . . . F. H. Brownell, mining executive, said that a shortage is imminent, and this will further depress commodity prices until gold can be mined in greater quantity at a profit . . . Smuggler-Union Mining Co., owner of the principal mine at Telluride, Colo., has dissolved its corporate organization. The mine produced over $50,000,000 in gold, but was abandoned some months ago.

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PENSIONS for the aged have been authorized by New York Legislature. An average of $242 will be paid yearly to about 51,000 citizens over 70 . . . H. S. Pritchett, president Carnegie Foundation, said that any old age annuity, provided without cost to the beneficiary, is in the long run demoralizing, no matter how high minded the group.

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STOCKS, as measured by a composite average of 100 representative issues, are at the same figure as a year ago . . . Dissolution suits against Aluminum Co. of America, charging unfair discrimination between customers, are dismissed by Federal Trade Commission . . . General Electric Co. net for the first quarter ($15,000,000) is $250,000 above the corresponding figure for last year . . . During 1929 the Great Atlantic & Pacific Tea Co. made a profit of 2½c. per dollar of sales on a total turnover of $1,054,000,000 in its chain of grocery stores.

Further Drop in Prices of Commodities

Wholesale prices reported upon by the United States Bureau of Labor Statistics show a March average of 90.8, compared with 92.1 in February, and with 97.5 in March, 1929. All figures are based on the average of 1926 as 100.

There has been an uninterrupted reduction, every month since last July having shown a loss. Large declines were reported in farm products and smaller ones in all of the other principal groups. Metals and metal products dropped fractionally from 100.9 to 100.6, the lowest since September, 1928, principally because of declines in non-ferrous metals and in agricultural implements. There was a fractional decrease in the iron and steel component. A year ago, prices were rising.

Raw materials, semi-manufactured articles and finished products all showed declines—the greatest being in those furthest removed from the ultimate consumer. Thus raw materials dropped 2.5 points, from 91.8 to 89.3; semi-manufactured articles dropped 1.5 points, from 92.1 to 90.6; finished products dropped 0.6 points, from 92.6 to 92.

Sharp Gain in Sheet Sales in March

Sales of steel sheets by independent mills gained sharply in March, and shipments were the largest since October, according to the monthly report of the National Association of Flat Rolled Steel Manufacturers. The gain in sales over February was 47 per cent, and in shipments, 14 per cent. However, production fell off nearly 16,000 tons. Unfilled orders gained 6000 tons. Stocks on hand were reduced 9000 tons, evidently reflecting releases of sheets that had been held up by consumers in the automotive field.

The March report and comparisons with the two previous months follow:

Net Tons	March	Feb.	Jan.
Capacity	521,250	486,500	556,000
Percentage reporting	67.5	67.5	67.5
Sales	299,764	203,315	382,122
Production	259,658	275,952	291,529
Shipments	275,235	241,441	241,677
Unfilled orders	524,230	517,215	558,412
Unshipped orders	116,470	125,839	117,584
Unsold stocks	75,847	75,771	73,948
Percentages, Based on Capacity			
Sales	85.1	61.8	101.8
Production	73.7	83.9	77.6
Shipments	78.1	73.4	64.4
Unfilled orders	148.8	157.4	146.2
Unshipped orders	33.1	38.3	31.3
Unsold stocks	21.5	23.1	19.7

Connersville Blower Co., Connersville, Ind., has moved its Chicago sales office to 20 North Wacker Drive. After May 1, the New York sales office of the company will be located in the Graybar Building, 520 Lexington Avenue.